AMERICAN GAS JOURNAL

th YEAR MAY 1947 VOL. 166, NO.

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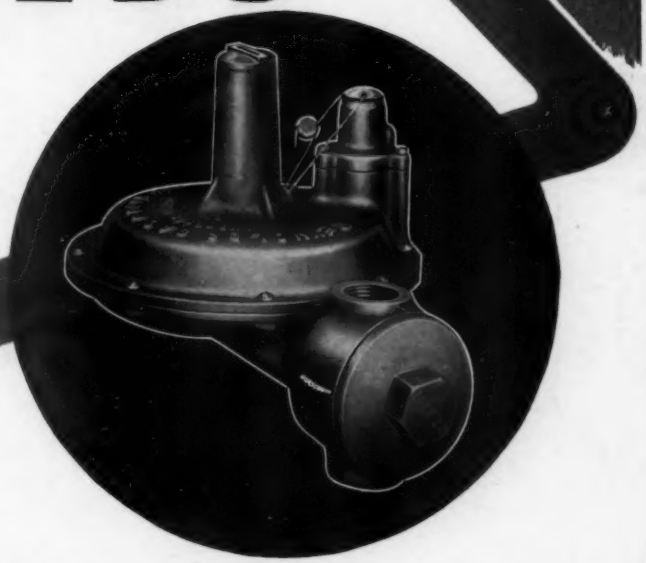
REYNOLDS

55 years of recognized gas control leadership..



Reynolds is proud of its leadership through five and a half decades of service to the gas industry. Regardless of where accurate gas regulation is needed—in the line—at the station—for industrial plants, or in the home, there is a superior product by Reynolds. Experienced Executives and Engineers have come to know that more than just typifying mechanical perfection the name Reynolds symbolizes a manufacturer who understands the needs of the Gas Industry.

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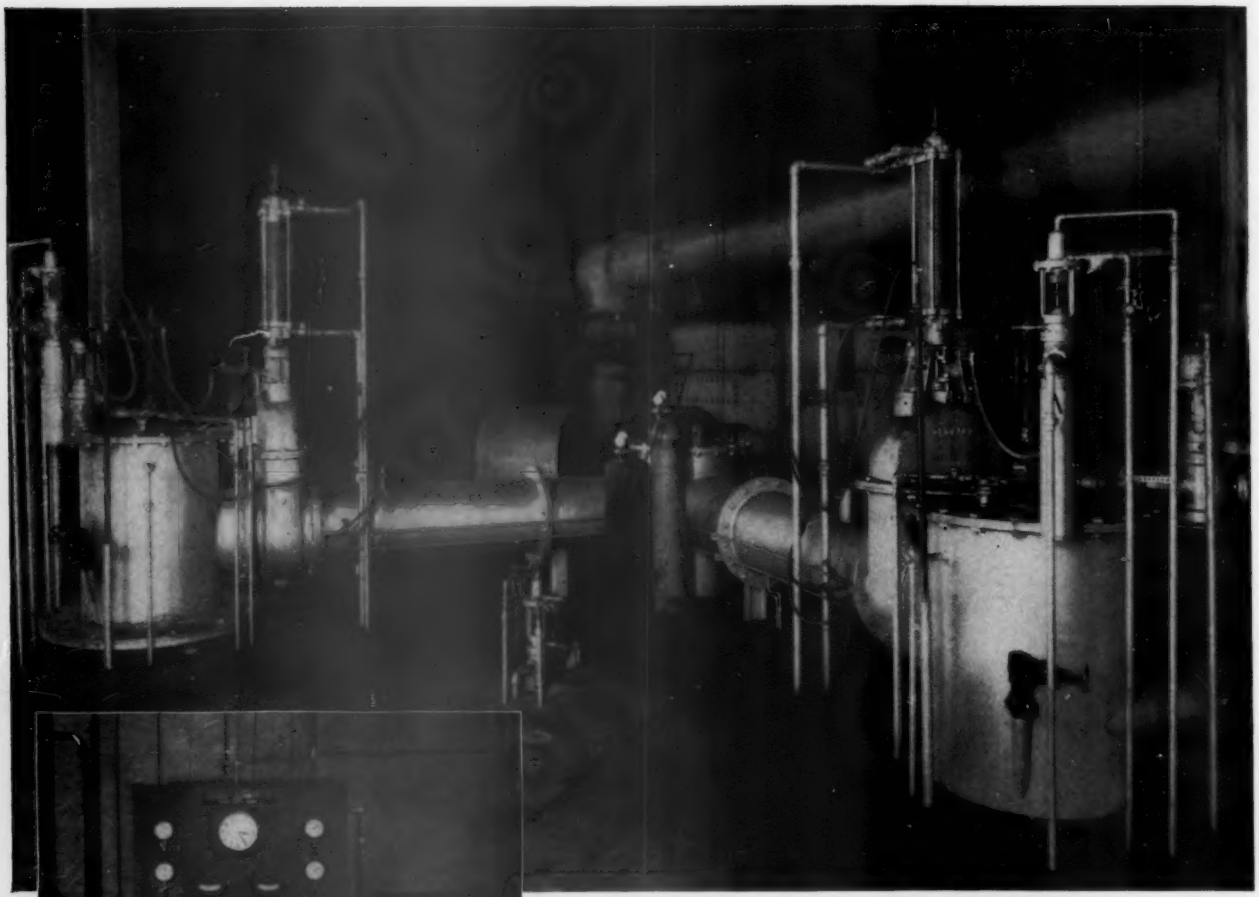


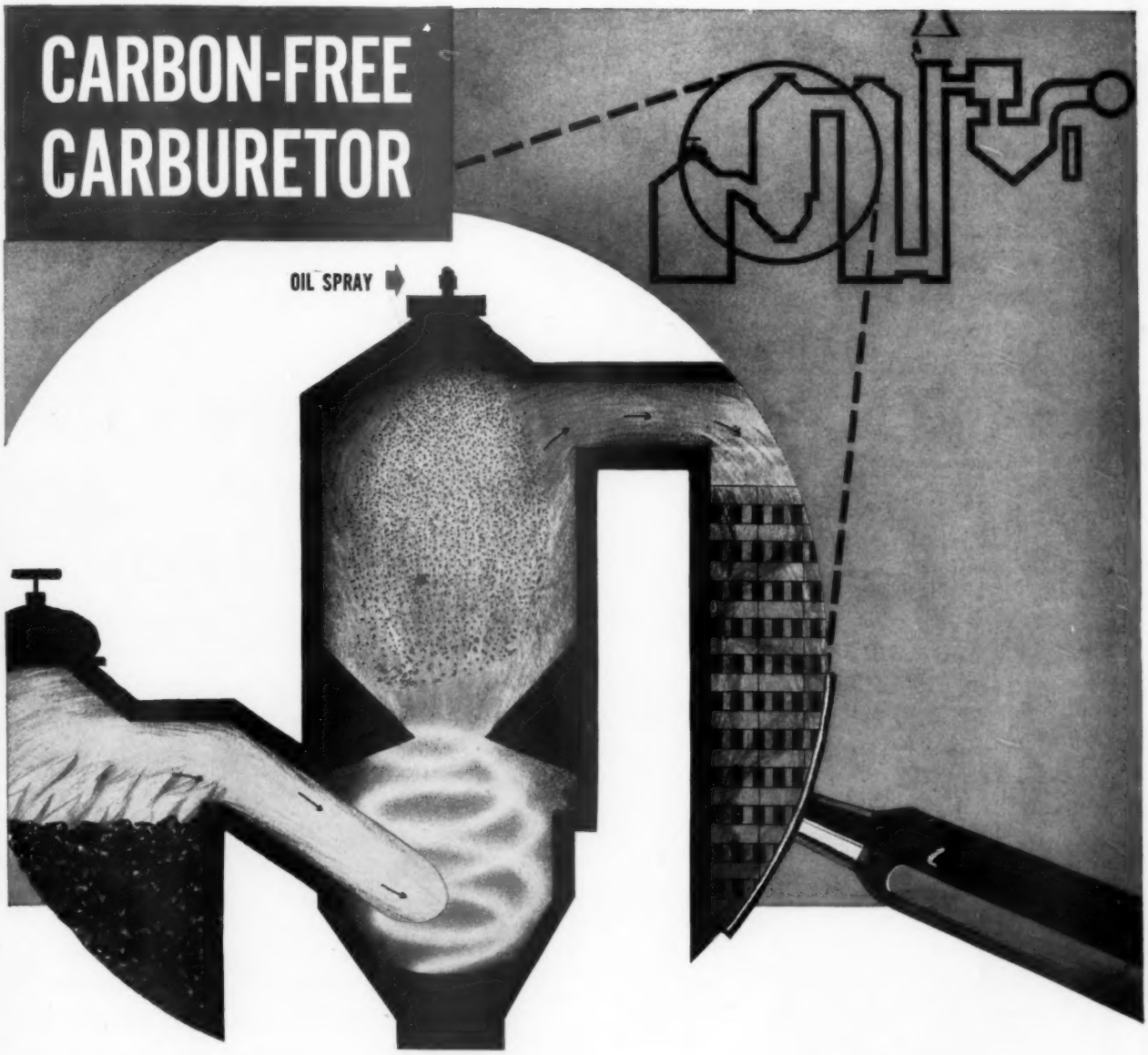
Twin Generator Oil-Gas Process
For Production of 1,000 B. t. u. Oil Gas
Eliminates Shutdowns
Reduces Operating Costs

No machine shutdowns for charging or clinkering. Oil is easily moved from tank car to storage holder with one pump and one exhauster. Overall manpower requirements in the average small plant do not exceed three men. Write for complete information.

THE GAS MACHINERY COMPANY
16114 Waterloo Road • Cleveland 10, Ohio

MAY 29 1947

CARBON-FREE CARBURETOR



OVER 3½ million gallons of oil, containing 1400 tons of Conradson carbon, were used in seven months' run of a single carburetor.

In our last report to you on the operation of one installation of the Semet-Solvay Reverse Flow Water Gas Machine we were able to state that no carbon had accumulated on the walls of the carburetor after a 34-day period of operation.

We are now able to say that, in a seven months' run, there has not been any delay for carbon removal.

SEMET-SOLVAY
ENGINEERING DIVISION
Semet-Solvay Company
40 RECTOR STREET NEW YORK 6, N. Y.

AMERICAN GAS JOURNAL, May, 1947. Vol. 166, No. 5. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa., Executive and Editorial offices at 53 Park Place, New York 7, N. Y. Entered as second-class matter October 7, 1928, at the post

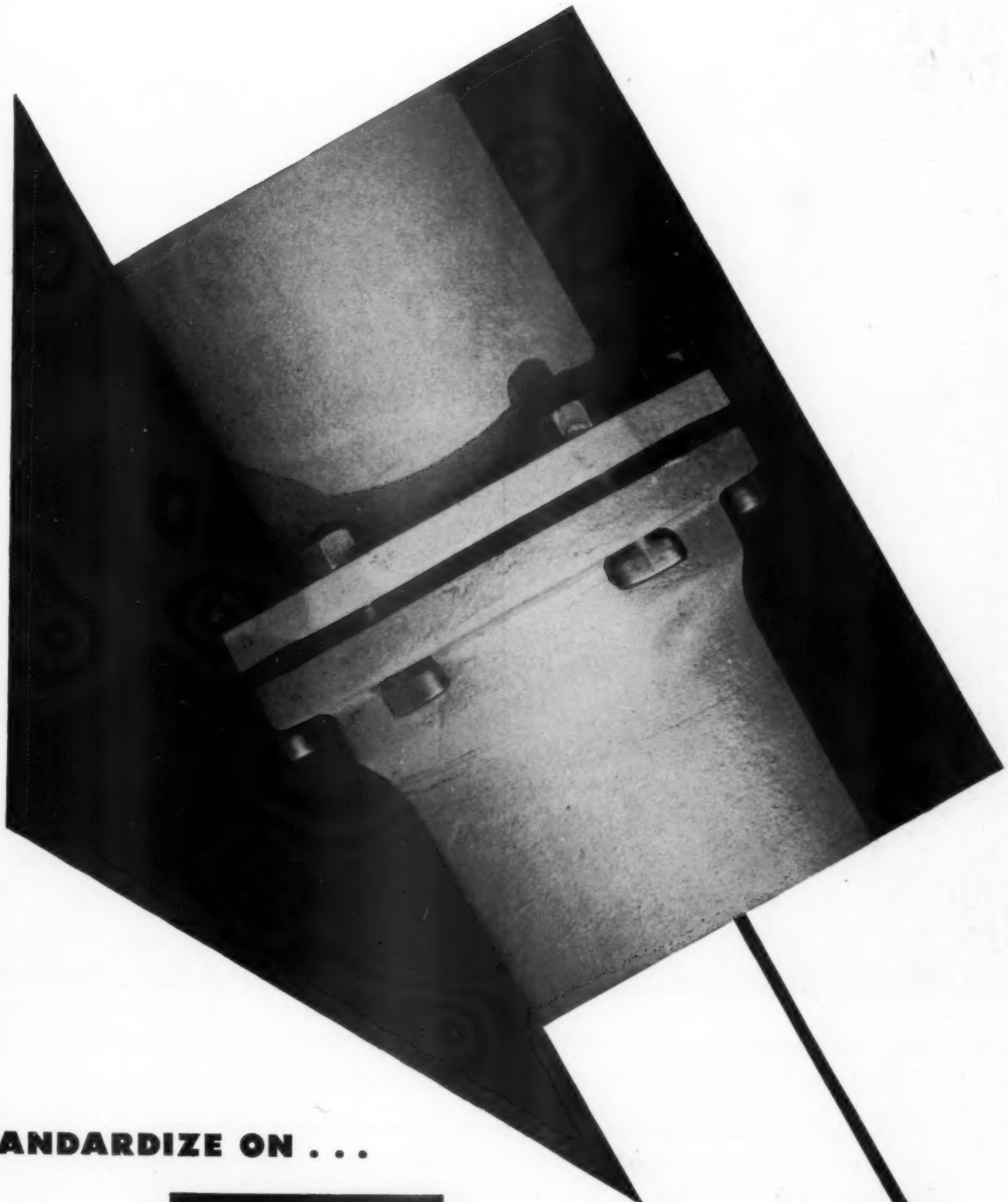
If the first 100 years are the hardest, the future is bright for this cast iron gas main, in excellent condition when uncovered on the 100th Anniversary of its installation in Boston.

SIMPLE AS CHANGING A TIRE

Any good careful workman can assemble it as easily as he can change a tire on his car. Without previous experience. With just one tool—an ordinary ratchet wrench.

He does not have to stop work because of wet weather. He is not slowed-up by a wet trench. He cannot be delayed by wrong accessories delivered to the job—all accessories are standardized and interchangeable. He works less hard but more lengths are laid per hour. The completed line is bottle-tight under all normal working pressures—bottle-tight and long-lived.

Is this a construction superintendent's Utopian dream? No—just a simple recital of the facts about Standardized Mechanical Joint Cast Iron Pipe—facts which are impelling gas utilities to standardize on this pipe for all future construction. Cast Iron Pipe Research Association, Thos. F. Wolfe, Engineer, Peoples Gas Bldg., Chicago 3, Ill.



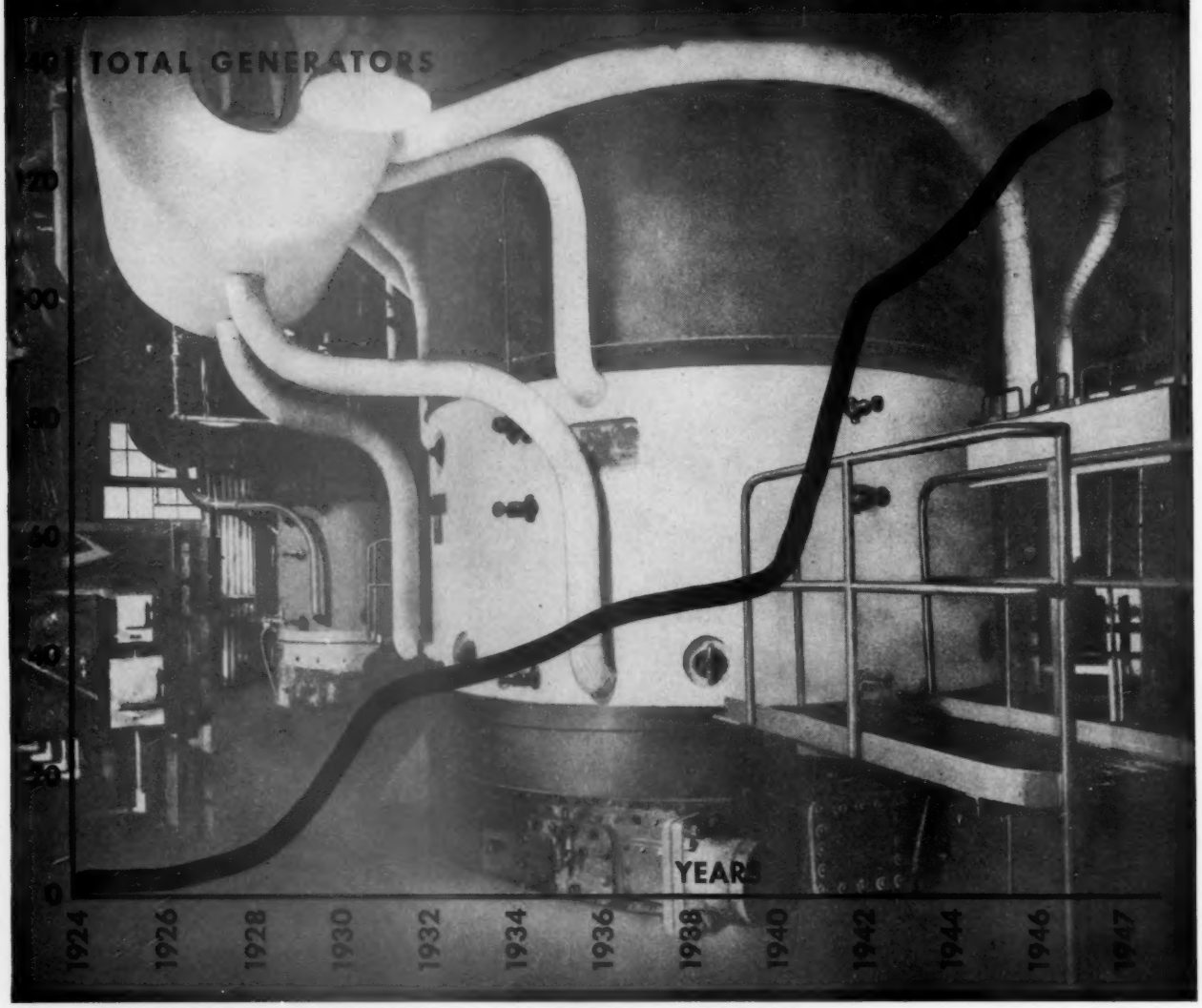
STANDARDIZE ON . . .

CAST IRON

Standardized **MECHANICAL JOINT**

PIPE

134 U.G.I. MECHANICAL GENERATORS



134 U.G.I. mechanical generators have been installed or contracted for since 1924
54 in 25 utility plants and 80 in 9 chemical plants

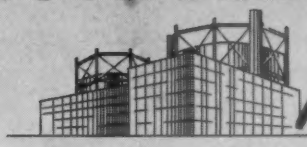
The U.G.I. mechanical generator incorporates in its design, some 25 years of operating experience in the production of blue water gas in chemical plants and in the production of carburetted water gas, using the many different kinds of solid fuels and enrichers that are available to produce enriched or reformed city gas of the specific gravity and heating value that is desired.

The U.G.I. mechanical generator has been, and still is, under continuous development. Set capacities have been increased from about 5,000 Mcf. per day, with original design, to over 11,000 Mcf. per day (heavy oil operation) in the present apparatus.

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK PHILADELPHIA CHICAGO

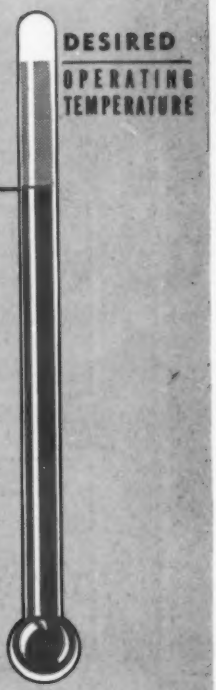
ARE YOUR PLANT OPERATIONS



Restricted

by the Refractories you use now?

PRESENT SAFE OPERATING TEMPERATURE



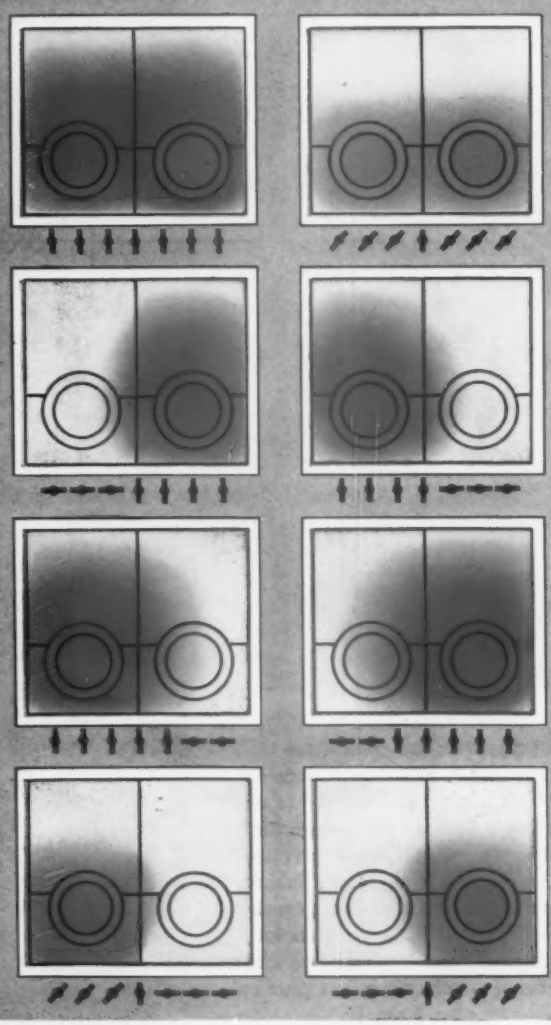
Although operating temperatures in water gas generators are seldom too high for the refractories used, other severe conditions present tend to reduce the service life of natural mineral refractories. Much can be gained both in operating efficiency and long lining life by employing a Special Refractory. Such a refractory is the Norton CRYSTOLON line of bricks and shapes which stand the gaff in gas generator operation. Made of silicon carbide plus a minimum of refractory bond, these brick are very dense in the sense of low porosity and permeability, physically strong, chemically stable and highly refractory. They are unaffected by molten coal ash slag because it cannot penetrate their dense surface. CRYSTOLON linings often pay for themselves the first year by savings in cleaning costs alone. They will usually give from 10,000 up to 25,000 hours of trouble-free service . . . depending upon operating conditions.

NORTON COMPANY **WORCESTER 6, MASS.**

See What the LEADER Gives You

—In Control of Heat on the Hot Top

Illustrated below are just a few of the heat variations which can be produced by the seven individually controlled Hot Top burners on the Garland.



Garland
No. 45-28CX

Garland's amazing flexibility of heat control on the Hot Top gives the chef any heat he wants—where he wants it—when he wants it. He can prepare better cooked food. He can do it faster. He can save fuel. He can help reduce the cost per meal served. For greatest value it pays to choose the leader. See your dealer or write us.

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FOR ALL COMMERCIAL COOKING

Heavy Duty Ranges • Restaurant Ranges • Broilers • Deep Fat Fryers • Toasters
Roasting Ovens • Griddles • All Types of Commercial Cooking Equipment

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A GAS STANDBY PLANT PAYS FOR ITSELF

watched storm-lashed
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—The coldest weather ever recorded on the North American continent was reported today by the Department of Transport weather station at Snag Airport in the Yukon.

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MAY
1947

AMERICAN
GAS JOURNAL

VOLUME 166
No. 5

Recent Developments in the Production of High Btu Gas For Mixing With Natural Gas

DEVELOPMENTS in the production of high Btu manufactured gas have recently been brought into prominence by the urgent need for greater supplies of natural gas than are currently available in certain sections of the country, particularly where there has come to be a heavy peak demand for gas house heating during the winter months. The serious shortages of natural gas last winter are too well known to require special mention.

Prior to 1926, natural gas had been regarded as a local resource and such transmission systems as existed served only very restricted areas. Thereafter improvements in pipe and in construction methods, combined with a realization of potential opportunities led to the installation of long distance transmission lines from the fields where there were few customers but large available supplies of gas to those in which there was little gas but highly concentrated population with important industries. Recent pipe line maps show the extent and importance which natural gas transmission systems have acquired during the past twenty years.

Almost from the start of these long distance gas transmission systems it became apparent that the utility companies which they served were faced with certain serious problems if they were to be sure of giving uninterrupted and economical service, such as they have traditionally provided.

First, they must be able to provide gas in large quantities, and over considerable periods of time, in the event of a major interruption of the natural gas supply. In such an emergency any part, or all of the requirements of the utility, and hence of the community, would have to be produced for an indefinite period.

The growth of long distance transmission systems serving natural gas has brought with it problems to be met. The continuity of the supply must be protected, peak loads in excess of pipe line capacity must be met and a good load factor on the system must be maintained. A supplementary available supply of manufactured gas of such characteristics as to be interchangeable with natural gas seems to be the answer. Some of the work done and processes used in this connection are here described.

Second, they must be prepared to take on peak loads, in the future, at such time as the growth of load produced peaks beyond the ability of the natural gas line to supply.

Third, they must control the pipe line load factor to decrease the difference between the average take from the pipe line and the maximum day's requirements. The contracts with pipe line companies have come to be based almost universally on maximum demand plus commodity charge.

The problem in each of these cases was and is the production on short notice and in adequate volume of a gas which would have such characteristics as to make it interchangeable with natural gas when mixed in any proportions with the natural gas or used by itself. It is also of great importance that it be possible to utilize existing equipment and convert it economically, preferably using cheap, familiar and readily available manufacturing materials.

Between 1930 and 1935, as a result of these conditions, a considerable amount of work was done on the production of manufactured gas which could be used as a substitute for natural gas.

A notable paper on "Developments in Gas Making Process for Peak Loads" was read before the 1935 Convention of the American Gas Association by Mr. Leon J. Willien. He found the following to be suitable for mixing with natural gas in the following percentages.

	Permissible Amounts in Sendout Gas	
	Prolonged Peaks	Short Peaks
Oil gas	70%	100%
Carburetted water gas	70	100
Butane or propane air gas	70	100
Blue gas enriched with butane	22	50
Carburetted water gas enriched with butane	20	50
Low gravity carburetted water gas enriched with butane	60	70
Reformed natural gas enriched with butane	90	90
Coal gas enriched with butane	100	100

The use of propane and butane with other gases to form a satisfactory substitute for natural gas is a matter which present space limitations prevent our now covering. This consideration is limited to use of carburetted water gas and oil gas for such purposes.

Public Service Company of Northern Illinois

One of the earlier installations, and one which is reported still to be in satisfactory operation is that of Public Service Company of Northern Illinois, which about 1936 installed a 12 foot Semet Solvay Engineering Corporation reverse flow water gas set at its Niles Center plant. The purpose was to augment the supply of 800 Btu mixed manufactured and natural gas being purchased. The results were as follows:

During the days when the object was to make a gas suitable to supply of mixed gas normally purchased, the following average results were obtained:

Specific Gravity	.626
B.t.u./C. Ft.	820
Hydrogen	30.6%
Make Per Run—MCF	18.4
Oil Per M—Gallons	8.46

Additional typical results were:

Blue Gas, 34.7%	297	B.t.u.
Oil Gas, 65.3%	11.40	B.t.u.
Cu. Ft. Oil Gas Per Gallon	79.8	
B.t.u. Per Gallon	91200	

Typical analyses of the high B.t.u. carburetted water gas made and of the mixed gas purchased are as follows:

	High B.t.u. Gas Made	Mixed Gas Purchased
CO_2	1.1%	1.0%
Olef.	15.8	2.1
O_2	0.6	0.2
CO	13.7	2.8
H_2	30.5	24.8
CH_4	33.1	55.6
C_2H_6	1.4	6.8
N_2	3.8	6.7
Total	100.0%	100.0%

It was the consensus of opinion of all concerned that a 50-50 mixture of these two gases was a satisfactory substitute for the gas normally sent out.

When it was attempted to make a low gravity high B.t.u. gas, capable of being substituted 100% for the normal supply, the following average results were obtained:

Specific Gravity	.576
B.t.u./Cu. Ft.	794
Hydrogen	37.2%
Make Per Run—MCF	18.4
Oil Per M—Gallons	8.59

Additional typical results were:

Blue Gas, 31.0%	277	B.t.u.
Oil Gas, 69.0%	953	B.t.u.
Cu. Ft. Oil Gas Per Gallon	85.2	
B.t.u. Per Gallon	81000	

CO_2	0.7%
Olef.	10.5%
O_2	0.5%
CO	11.9%
H_2	36.5
CH_4, C_2H_6	34.1
N_2	5.8

Detroit, Michigan

Natural gas was brought to Detroit in 1936 and the existing 11 foot carburetted water gas sets were modified so as to permit the production of a high Btu gas made from coke and oil.

Tests indicated that the most suitable manufactured gas had the following general characteristics as compared to the natural gas under contract:

Analysis	Manufactured Gas Produced by Modified Water Gas Machines	Texas Natural Gas Supplied to Detroit
Carbon dioxide	1.1%	0.1%
Illuminants	23.4%	...
Oxygen	1.1%	0.3%
Hydrogen	27.5%	...
Carbon Monoxide	6.8%	...
Methane	30.8%	77.1%
Ethane	4.3%	13.6%
Nitrogen	5.0%	8.9%
B.t.u. per cu. ft.	937	1015
Specific gravity	.670	.691
Sulphur content	150-300 grains per 100 cu. ft.	Nil

The materials necessary for producing one thousand cubic feet of this substitute gas were approximately as follows:

Oven coke, egg size	20 lbs.
Oil, either 32°-36° B gas oil or crude oil	10 gals.
Steam	15 lbs.

These sets are now reported to be in course of conversion to the Gas Machinery Company Twin Generator Oil-Gas Process. (For further details of previous process see George T. Bentley, *American Gas Journal*, August 1937, p. 17, or American Gas Catalog and Handbook, 1938, p. 57.)

New Orleans, La.

New Orleans introduced natural gas in 1928, and soon after doing so began experiments to determine the best interchangeable gas that could be made using a carburetted water gas set. (See H. M. Blain, A.G.A. Production Conference, 1940.)

The composition of the natural gas was substantially as follows:

CO_2	.24%
O_2	.55%
CH_4	94.60%
N_2	4.61%
Total	100.00%

Calculated Btu 960
Calculated Specific Gravity 5786

From 1935 to 1940 manufactured gas was produced each winter day for peak loads using three types of operation; (1) Koppers High Btu Water Gas Process with the reversed air blast, (2) Refractory Screen Oil Gas Process, (3) Single Stage Oil-Gas Process.

Koppers High Btu Process

A carburetted water gas set, modified with reversed air blast, was used to produce a 950 Btu gas with coke as generator fuel and gas oil in the carburetter and generator. The changes required to convert the set to high Btu operation were:

1. Installation of generator oil spray.
2. Installation of generator sweep steam connections.
3. Installation of ten port automatic control.
4. Re-arrangement of carburetter checker brick.

The results of the operation were as in the table below:

Refractory Screen Oil Gas Process

With this process, oil was used exclusively for making gas and maintaining the heats throughout the set.

In order to convert the water gas set to this process it was necessary to make the following additions:

1. An installation of down blast piping and valve on top of the generator.
2. Installation of generator and carburetter oil burner.
3. Arch and tile supports in the base of the generator to support the refractory screen.
4. Installation of generator oil spray.

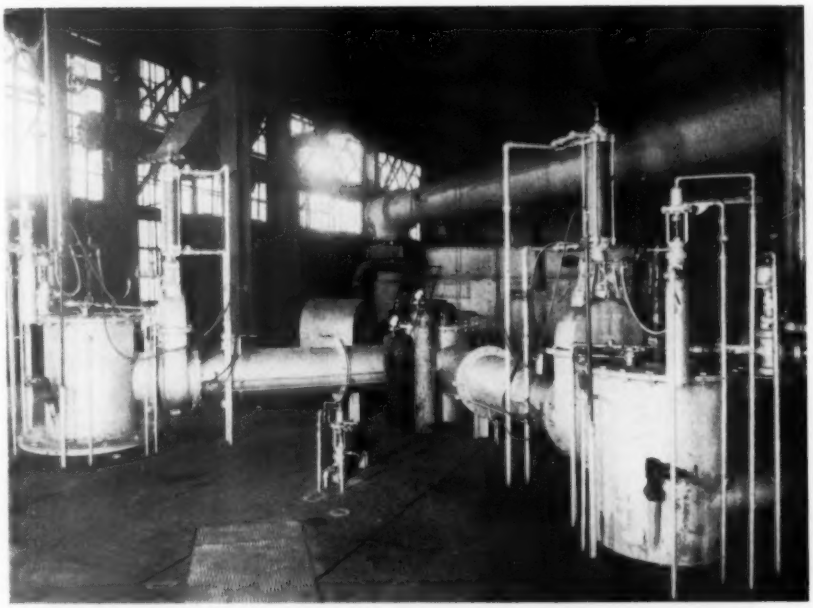
In place of coke in the generator, there was substituted a refractory bed or screen of about 45" depth with six rows of checker brick on top of this bed, all of which were suitable support with refractory

Gas Analysis—CO_2	1.25%	1.33%	1.46%	1.53%
Ills.	20.77	23.34	21.72	21.44
O_2	0.14	0.13	0.13	0.61
H_2	31.20	27.20	26.75	26.98
CO	8.91	6.93	8.21	6.58
C_2H_6	1.86	2.67	1.41	2.08
CH_4	29.10	37.20	34.79	33.48
N_2	6.77	1.20	5.53	7.30
Total	100.00%	100.00%	100.00%	100.00%
Avg. BTU per Cu. Ft.	930	942	934	895
Calc. Sp. Gr.	.6346	.6514	.6547	.6583
Coke per MCF—Lbs.	30.00	32.60	29.40	30.00
Gen. Oil per MCF—Gals	6.68	6.68	6.25	5.86
Carb. " " " "	3.31	4.10	3.72	4.14
Total " " " "	9.99	10.78	9.97	10.00

arches and tile in the base of the generator.

In place of the old coke charging door at the top of the generator an air line was used to convey the down blast air through the bed. Installation of the oil spray with center oil burners was made through the generator dome.

The set was brought to operating temperatures by first lighting the bottom generator oil burner using approximately 6000 Cu. Ft./Min. of generator air and 2½ gallons of oil per minute. When the bottom generator couple reached about 1800°F. and the carburetter 800°F. the carburetter burner was lighted with secondary air to heat both the carburetter and superheater. When the generator bed had reached a temperature of about 2100°F., the carburetter, 1600°F. and superheater 1350°F. the set was ready to begin the gas making cycle. The total time required from a cold start averaged about three hours.



Twin Generator Oil-Gas Generator Charging Nozzle and Carbureter Top Nozzle on which have been installed Tee Connections for the Admission of Combustion Air, Process Steam, Purge Steam, Hot Oil Burners and Make Oil Sprays

Gas Analysis—CO_2	1.62%	1.96%	2.10%	1.82%
Ills.	22.18	23.29	24.09	25.88
O_2	1.98	0.78	1.22	1.16
H_2	28.11	29.65	30.89	22.89
CO	3.97	4.31	3.84	2.66
C_2H_6	3.24	3.52	3.02	2.54
CH_4	25.05	26.22	27.29	30.10
N_2	13.85	10.27	7.55	12.95
Total	100.00%	100.00%	100.00%	100.00%
Avg. BTU per Cu. Ft.	925	936	953	912
Calc. Sp. Gr.	.6890	.6737	.6611	.7340
Gen. Make Oil per MCF	3.74	3.98	4.47	3.95
Carb. " " " "	6.88	6.60	6.91	6.80
Gen. Heat " " "	0.27	0.40	0.45	0.38
Carb. " " " "	0.71	0.80	1.14	1.07
Total Oil per MCF	11.60	11.78	12.97	12.20

Single Stage Oil Cracking Process

After operating at peak loads for several years using the refractory screen method almost entirely, the New Orleans Public Service Company began experimenting with one of its sets to simplify the conditions by cutting out the down blast and by eliminating the down run and use of the hot valve. This method has been called the Single Stage Oil Cracking Process because all of the process oil is subjected to only one stage of cracking to form the finished gas. The greater amount of oil is sprayed into the generator instead of the carburetter and is cracked on top of a lower refractory bed with sweep steam. Simultaneously, oil is cracked in the carburetter and the resulting finished gas is held to 950 Btu by increased checker brick and heats. Gas oil is used in both the generator and carburetter for smoke elimination. It is reported that the chief advantages of this method of operation are:

1. Simplified operation with no down blast or hot valves.
2. Less maintenance required on generator arches and refractory bed.
3. Better quality and more tar produced.
4. More capacity per set.
5. Has high Btu and specific gravity control.
6. Better gas for interchangeability with natural gas.
7. Positive elimination of smoke during the blast period.

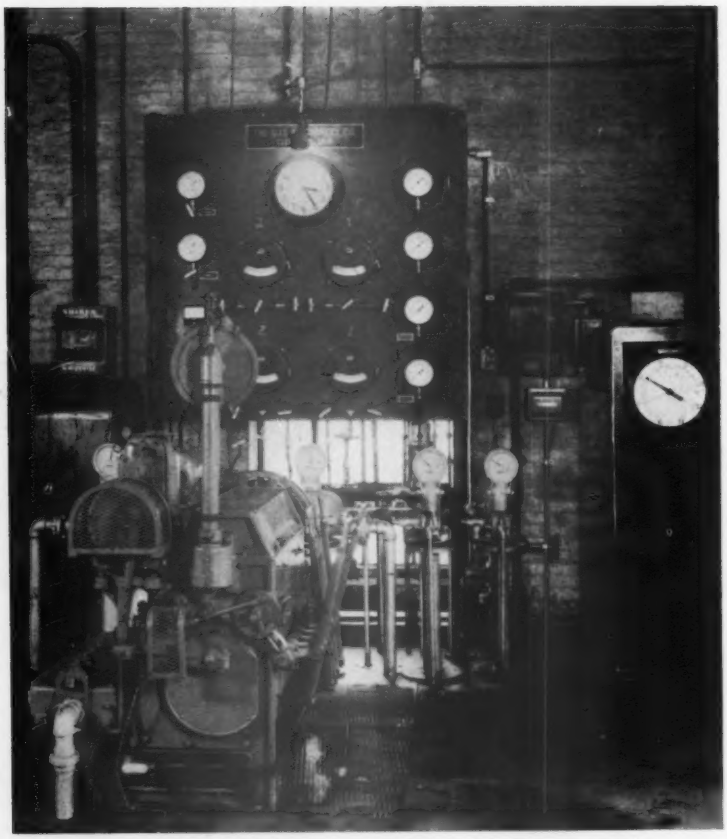
This process with further development and improvements is now known as the Twin Generator Oil-Gas Process of The Gas Machinery Company. It is installed and in use by the Iroquois Gas Corporation at Buffalo, New York.

Fundamentally, the equipment used bears strong resemblance to a standard carburetted water gas set. In fact, such a set may be converted to high Btu oil-gas operation with relatively small expense.

To make such a conversion the essential changes necessary are the removal of the present top connections of the water gas set between the generator and carburetter. These are blanked off with refractory material and blank flanges. The bottoms of the shells are then connected in a fashion similar to a carburetter-superheater cross-over. As an alternative a single generator of adequate capacity may be installed instead of the generator and carburetter above specified.

With the commonly used arrangement, the generator grates are removed and replaced with checker arches similar to the carburetter checker arches. Sufficient checker brick of proper design to fit the cracking characteristics of the oil used are placed on these arches in both the old generator and the old carburetter.

The generator and the carburetter blasts are taken off as is the back run pipe or hot valve arrangement and top blasts are placed on the old generator charging nozzle and carburetter top nozzle, both lines being metered for air flow and control. Heat oil burners and make oil sprays



Automatic Control and Instrument Panel with Pyrometer for Twin Generator Oil-Gas Set

are placed in the tops of both generators as is steam piping for purge and process steam. These lines are all equipped with necessary meters and control valves.

Both generators (generator and carburetter) are heated downwardly with liquid fuel burners and operate in parallel, the combined combustion products passing upward through the checkered superheater where the sensible heat of the gases is extracted by the checker brick and used in the "make" part of the cycle to fix the oil vapors as a stable gas. From the superheater on, the rest of the plant apparatus functions as in regular water gas operation.

One Indicating Thermocouple is placed in each generator near the bottom of the checker brick and shielded in such fashion as to read brick temperature rather than flame temperature and as protection against being turned off by high flame heats. Another couple is placed in the tunnel connecting the generators to the superheater with the fourth couple being located in the checker brick four to six courses from the top of the superheater checkers. Either of these last two couples can be used for the temperature control point though this is usually done from the tunnel couple.

Operations are cyclic, having heat and make portions with the necessary periods for proper purging. When on the heat cycle and proper temperatures have been obtained for the optimum cracking of the oil, depending upon its characteristics, the burners are turned off and make oil admitted along with process steam so that the oil is cracked in an atmosphere of superheated steam.

Checker brick life has thus far proved to be over 2500 hours without any apparent reduction in efficiency.

No. 2 or No. 3 gas oil has thus far been used in the operation of the Gas Machinery Oil-Gas process. Heavier grades of oil are expected to be tried in the next few months. The total steam and oil required per thousand cubic feet of 1000 Btu gas is approximately as follows:

Oil per M—Heating	1.20	to	1.70	gallons
" " " —Make	8.57	to	9.70	"
" " " —Total	9.77	to	11.40	" (Avg. about 10.50 gal.)

Heating and Gas Making Steam per M — 25 pounds

Total Steam for Plant using Exhaust Process Steam (exclusive of gas compressor steam) — 56 pounds

Tar Recovered about 15% of make oil used.
(This oil settles out to about 6% water in the separators and to about 2% water when heated.)

The operating cycle on twin generator set is about as follows:

Blow	— 135	seconds at 9500 cu. ft. of air and 4.0 gallons of oil per generator per minute.
Run	— 81½	seconds at 90 pounds of steam and 45 to 55 (avg. 50) gallons per generator per minute.
Blow Purge	— 12	seconds
Steam Purge	— 10	seconds
Valve Loss	— 2½	seconds
Total	241	seconds

Average Air per M—2172 cubic feet
Capacity per twin 12 foot generators 6,000 M to 7,000 M per 24 hours of 1,000 Btu gas.

Gas Analysis			
CO_2	1.62%	1.1%	2.9%
Illuminants	22.45	— —	27.1
O_2	1.18	24.2	10.4
H_2	22.90	24.2	10.4
CO	.88	2.6	1.3
CH_4	42.70	43.8	31.0
C_2H_4	— —	16.4	— —
C_2H_6	— —	2.2	— —
C_3H_6	— —	1.1	— —
N_2	8.27	4.0	24.4
Propane & Heavier		3.6	
Total	100.00	100.0	100.0
Specific Gravity	.66	.633	.86
Btu Calculated	970	977	1002
Btu Observed	— —	— —	980

Joint Distribution and Motor Vehicle Conference

SIX HUNDRED gas company representatives were in attendance at the 23rd Annual Distribution Conference and the 6th Conference on the Operation of Utility Motor Vehicles, held in Cleveland, O., April 14, 15 and 16.

The afternoon of the 14th, and all of the 15th were devoted to group conferences, at which many subjects were discussed, and all "off the record." This was a somewhat new departure, and the Chairman, J. H. Collins, asked those in attendance to write and express their opinion of the plan.

A general sessions meeting was held Monday forenoon, with J. H. Collins, Chairman, Distribution Committee presiding. The delegates were welcomed to Cleveland by Karl Emmerling, The East Ohio Gas Co. The first speaker was H. Carl Wolf, Managing Director, A.G.A., who reviewed some of the activities of the Association.

W. F. Brown, Consolidated Edison Co., New York presented the first paper titled "An Approach to Driver Education." "It is a well known fact," Mr. Brown said, "that considerably more progress has been made in commercial vehicle safety throughout the Nation than in the private owner class. There are three reasons why this change has been accomplished—first: the profit motive on the part of the Insurance Companies and Fleet Owners has been a powerful stimulus to reduce accident costs. It is just bad business for a Public Utility to kill off its customers. Second: Industrial and Commercial leaders have organized to co-ordinate and co-operate to a degree that has not been approached by groups of private individuals, and third: regular periodic physical examinations have eliminated those who are physically unfit to drive commercial vehicles while there is no such restriction on the private individual. In other words, we commercial vehicle operators have quit yawning about highway accidents and are doing something about them.

"Permanent accident reduction does not come through spasmodic campaigns. Holding occasional safety meetings or presenting awards or bonuses to drivers in the hope that it will have the desired effect is seldom worthwhile. There must be a continuous and well-balanced safety program including all of the seven fundamentals of commercial vehicle operation in order to bring about a permanent control of accidents.

"Since the whole fleet Safety Program revolves around the driver, it is highly important that great care should be used in selecting these men. A little time and expense in the beginning may save much trouble and much expense later on. Once a driver is hired, the selection tends to stick and if the employer is not careful, he is "stuck with him." We must recognize the fact that *individual differences in people are real and lasting,* therefore, the employer can improve his safety program materially by selecting the drivers who are least liable to have accidents.

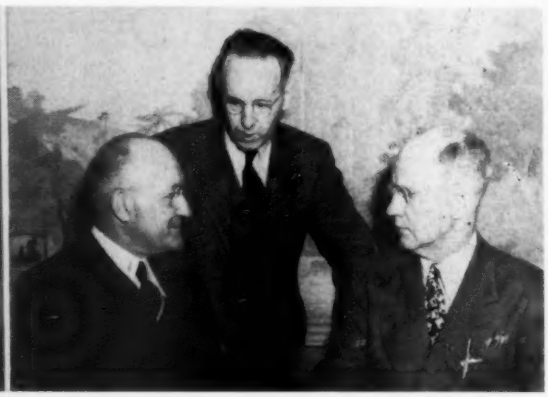
"We, in Consolidated Edison, try to show the driver just how he fits into the Company operations — how important he is in the program of rendering service to our consumers —people are usually "down on things they aren't up on" and the more the driver knows about the Company problems the better he will cooperate. He wants to know about his wages, hours of work, company policies regarding medical, insurance and other benefits, customer relations, advancement policy and safety program. A poorly informed employee is fertile field for exploitation by the 'commies' and other 'Un-American' groups."

Mr. Brown outlined their method of selecting and training their drivers, and concluded by stating seven fundamentals of a fleet safety program, as follows:

1. A sincere interest in the safety program on the part of management —which implies the duty of providing the men, materials and money and the executive direction necessary for success.

2. The collection and analysis of accident reports, accident investigation data and the maintenance of an adequate statistical record system in order to know exactly what it is that we wish to prevent. This includes

(Left to right:)—C. S. Goldsmith, Chairman, Technical Section Brooklyn Union Gas Co.; L. A. Evarts, Long Island Lighting Co.; Garden City, N. Y.; D. M. Marsh, M. B. Skinner Co.; F. R. McMurray, M. B. Skinner Co.; T. Cecil Wray, Nashville Gas & Heating Co.



Left: (right to left)—J. M. Pickford, Northern Indiana Public Service; Chas. L. O'Reilly, Boston Consolidated Gas Co.; Thos. F. Smith, Boston Consolidated Gas Co.

Right: (right to left)—Linn Edsall, Philadelphia Electric Co.; E. W. Jahn, Cons. Gas, Elec. Light & Power Co., Balt.; B. D. Connor, Chairman, Motor Vehicle Committee, Boston Consolidated Gas Co.

costs as well as collisions.

3. A careful selection and training of new drivers to provide men who are not only physically and technically qualified but who have the proper mental attitude as well.

4. A continuous program of activities including Health Inventories, Periodic Classes of Instruction, Rallies, utilizing every means of motivation such as film strips, sound movies, posters, contests, etc.

5. The proper selection and adequate maintenance of vehicles to insure maximum safety and efficiency of both vehicle and driver.

6. A practical system of driver awards and a fair and square program of disciplinary measures for those who fail to respond to other stimuli.

7. The proper supervisory control, including sound operating rules, reasonable trip schedules, and field supervision methods.

The morning session ended with the presentation of a paper by James A. Whelpley, Assistant Manager, Gas Distribution Dept., Cincinnati Gas & Elec. Co. on "Job Classification and Evaluation." He said:

"In the Fall of 1943 the employees of our company were in three units which are now represented by three different unions: the United Mine Workers in the Gas Operating Department; the International Brotherhood of Electrical Workers in the Electric Operating Department; and the Independent Utilities Union in the non-manual and clerical departments. Contracts with these unions were either in force or about to be negotiated.

"Our management recognized that, over the years, there had developed certain wage inequalities for similar types of work being performed in different departments. Wage schedules of individual departments might appear to be all right from the standpoint of that department, but certainly required review with respect to a company-wide policy. It was therefore determined that a well planned and properly carried out Job Classification Plan was necessary if satisfactory employer-employee relations were to be maintained.

"A few of the benefits which we felt would result from such a properly executed plan were:

(1) Clearly defined wage schedules which would provide for individual wage increases for merit or length of service.

(2) A normal and systematic promotional plan.

(3) Clear cut job descriptions

Upper: (left to right) E. J. Crain, Rochester Gas & Electric Co.; Donald J. Miller, Public Service of Colorado, Denver; Chas. J. Gregg, Dresser Mfg., Bradford, Pa.; Chester Schlenker, Rochester Gas & Electric Co.; Chas. D. Taft, Gas Service Co., Kansas City, Mo.

Lower: (left to right) T. J. Perry, Chairman, Subcommittee—Work on Consumers' Premises (Brooklyn Union Gas Co.); A. C. Cherry, Vice Chairman—Technical Section (Cincinnati Gas & Elec. Co.); G. W. L. R. Travis, Consolidated Edison Co. of New York, Inc.; T. A. Bradley, Kansas City.

which would be equally important to the employee as well as to management.

(4) By application of the Job Descriptions, selection of new employees who are better suited to the job.

(5) Elimination of intra-plant inequalities in wage schedules.

(6) An intelligent basis for simplified application of general increases or decreases as business or other conditions might warrant.

(7) A consistent promotional system which under ordinary circumstances is provided at little or no extra cost to the company.

"In planning such a program, it was important that the plan be designed to meet the overall needs of the individual company and yet be flexible enough to permit efficient operation of its various departments, and to provide for adjustments to meet new or changed operating conditions.

"Consideration was given to several methods of Job Evaluation: Job ranking; Predetermined rating; Evaluation by point system; and Evaluation by factor Comparison methods. After considerable study by our Industrial Relations Department, it was felt that satisfactory results for our particular problem could be obtained by using a system which had been used successfully in other public utility companies and which combined the point system and factor comparison methods.

"Ordinarily, where a union holds a bargaining contract with a company, it is desirable to make provision in a Job Evaluation Plan for participation of the union in carrying out the plan. However, due to the situation which existed in our case, namely the negotiations with three separate bargaining units, it was felt that the plan should be carried out without union participation as a Job Study and Review, with a view of obtaining reliable and detailed information on which to base our judgment and actions when contract negotiations were undertaken.

"A Job Classification and Evaluation plan provides:

(1) A set of job descriptions which prescribe typical duties and qualifications.

(2) A set of promotional charts indicating the line of normal progression in the respective departments.

(3) A set of wage rate schedules containing minimum and maximum wage rates for all jobs and steps of progression to arrive at the maximum wage rate.

There are five definite steps involved in the preparation of such a plan:

(1) Preparation of the job descriptions by the various departments.

(2) Preparation of the promotional charts by the various departments.

(3) Evaluation of the jobs as described in the job description.

(4) Plotting of jobs by point evaluations and existing wage rates and the determination of the existing weighted average and maximum wage rate trend lines.

(5) Establishing a set of wage rate schedules for all jobs.

"The completing of the first three phases of the program, i.e., the preparation of the job descriptions, the preparation of the promotional charts, and the analysis and evaluation was accomplished by the establishment of a Job Classification committee. This committee consisted of at least one *responsible* representative for each major department, who had the authority to represent the Department Manager and who kept him informed of the progress of the program. It is obvious that this representative be from above the level of jobs that are included in the union bargaining units, that he have a thorough knowledge of the operations of his department, should be discreet and diplomatic, and have an open mind regarding the value and usefulness of a job classification and evaluation program.

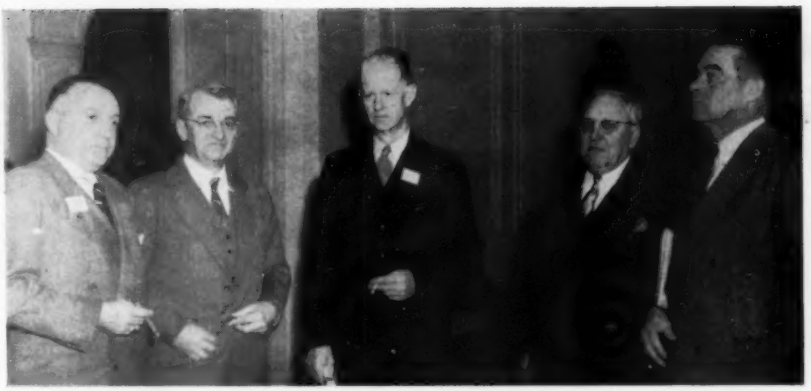
"Let us consider first the preparation of the job descriptions and promotional charts.

"Under the direction of the department representative each department prepared job descriptions which consisted of a statement of the nature of the work involved in the job classification in sufficient detail to identify the title and content to those familiar with the organization; also a statement of the minimum qualifications required to enter the job.

(1) Indicate the character and grade of the work.

(2) Indicate the variety of duties.

(3) Distinguish each job classification from another."



(Left to right):—J. H. Collins, Chairman—Distribution Committee (New Orleans Public Service) John Diehl, American Meter Co.; O. C. Waters, Atlanta Gas Light Co.; B. H. Elliott, Birmingham Gas Co.; A. F. Benson, American Meter Co.

The last general session meeting was Wednesday morning. E. L. Henderson, United Gas Corp., Houston, Texas presented a paper titled, "Installation of Gas Service Piping," which is printed in this issue of the *Journal*.

"Conserving Gas Supply During Emergencies" was discussed by C. S. Goldsmith and T. J. Perry, Brooklyn Union Gas Co. They discussed measures taken by their company during the past winter, and then answered many questions from the floor.

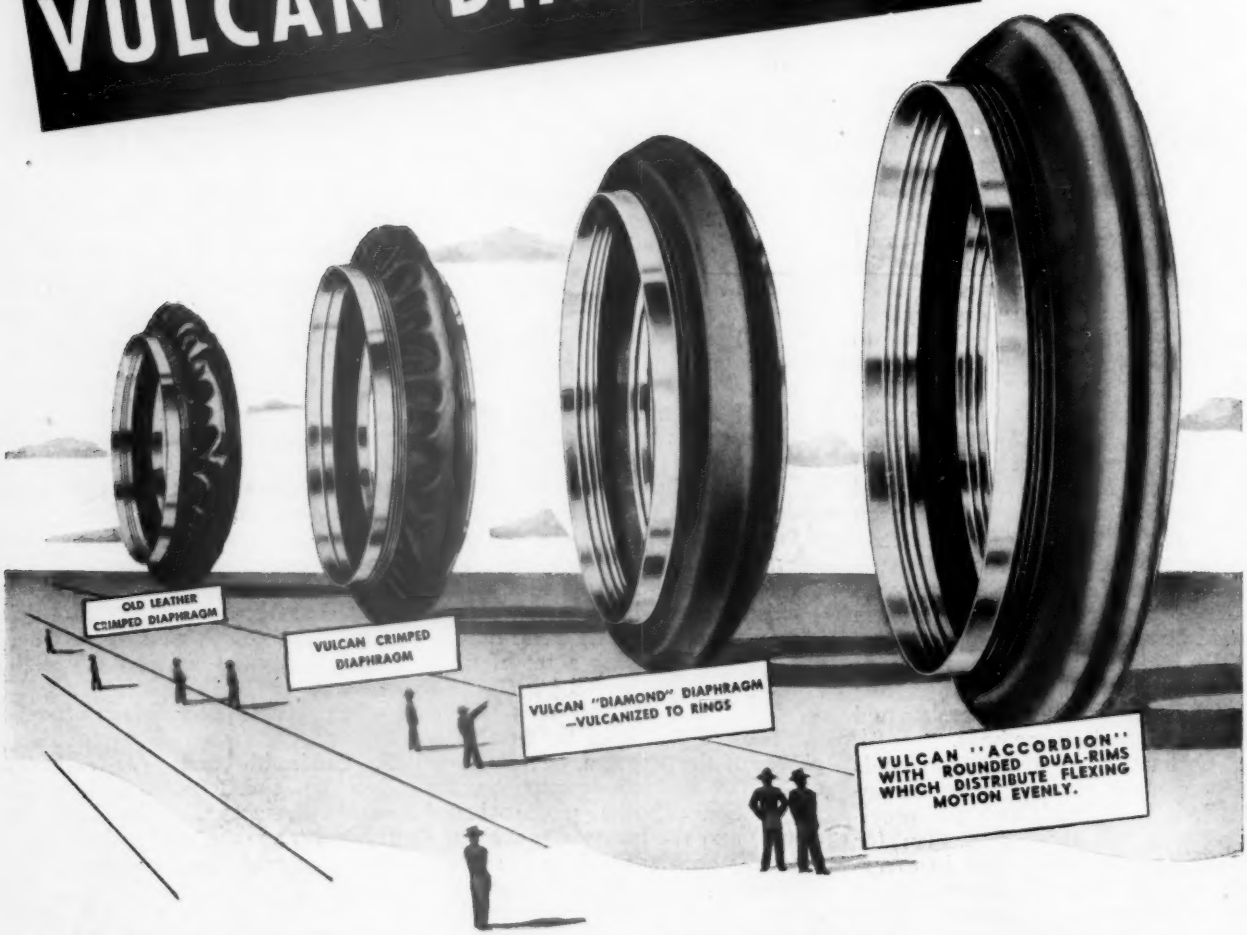
The final session was devoted to a summary of round table and luncheon conferences, by the chairman of each.

A general luncheon was held Tuesday, and the speaker was Col. Hudson W. Reed, President, Philadelphia Gas Works and Vice-President, American Gas Association.

Col. Reed contrasted past practice with present-day distribution conditions caused by revolutionary changes in appliance design and the characteristics of the house heating load.

"The distribution engineer must meet these new conditions by changing his thoughts, his practices and often his personality. While well-grounded in established distribution practices, he must be prepared to discard those which are inadequate and he must have thorough knowledge of load characteristics, and as nearly as possible rate and extent of future growth."

Evolution of the VULCAN DIAPHRAGM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FOR USE IN MANUFACTURED, NATURAL AND LP GASES

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Installation of Gas Service Piping

By
E. L. Henderson
Assistant Operating Manager, United Gas Corporation, Houston, Texas
Chairman, Subcommittee on Construction & Maintenance

THERE is an urgent need in the gas industry today for the development and adoption of every practice of construction, maintenance, and operation, which will lower costs, speed up our work, and give better service to our customers. Never before has the gas industry experienced a greater demand for expansion of its service. All companies are seeking ways in which to accomplish more with the limited quantity of materials and the precious and costly man hours of labor which is at their disposal. In an effort to appraise the possibilities which lie in one important phase of our business, this paper has been prepared to present the results of a survey of the practices being followed today by a representative group of gas companies throughout the United States in the installation of domestic service lines.

The survey consisted of a number of questions which have been answered by 117 gas companies, owning and operating approximately 11½ million service lines. It is estimated that these companies represent more than one-half of the gas industry in the United States. In the tabulation of the answers to this questionnaire, all data is included which seemed to be clearly set forth, although a few of the answers were somewhat indefinite as to their meaning, probably because of a lack of clarity in the wording of some of the questions and, therefore, were not tabulated.

It must be recognized that certain practices and specifications must be influenced by the character of gas distributed and the climatic conditions and other local peculiarities encountered in various areas. The tabulation of the answers, therefore, has been broken down separately according to whether natural gas or manufactured and mixed gas is distributed, and broken down further by sections of the United States in which the respective reporting companies operate; namely, Northeast, Southeast, Northern, Central, Southwest and Pacific Coast Sections. This breakdown permits an analysis by any company of the current practices of other companies throughout the United States, as well as those in his own area where similar conditions and requirements should prevail.

Local Ordinances

It is recognized that the practice of many companies is controlled by the provisions of city ordinances which, without revision, often times do not permit practices and methods which have been found to be lower in cost and more effective than those which were incorporated in a city ordinance many years ago. This paper perhaps may be of assistance in bringing about the revision of some restrictive and unnecessary ordinance requirements in instances where the practice of other companies, as reflected herein, will support the judgment of the management of the local gas company.

Variance in Methods

Although certain practices naturally should be influenced by climatic conditions and the character of gas distributed, nevertheless, it is surprising to observe the wide variances which exist in the methods of companies operating under the same general conditions. Why do 45 companies test new services with air pressure while 71 companies do not? Why do 44 companies believe that a careful grade should exist on medium and high pressure service lines while 43 companies do not think it is necessary? Why do 21 manufactured and mixed gas companies consider service stoppages a major problem while 44 companies, also distributing manufactured and mixed gas, report that it is not a major problem with them? Why does 60% of the manufactured gas industry use 1¼" pipe as a minimum size for medium pressure services while in the natural gas industry 80% of the companies used ¾" and 1" as minimum sizes? Why does 70% of the manufactured gas companies use ¾" pipe as a minimum size for high pressure services while more than one half of the natural gas industry uses pipe larger than ¾" as a minimum size for this pressure? It is interesting to learn that 18 companies, owning 2,400,000 service lines, use 1½" pipe as a minimum size for low pressure service lines while a great majority of companies report that 1¼" pipe is the minimum size used for low pressure.

Protection and Depth

These few questions and observations have been presented to illustrate the need, on behalf of the gas industry and each individual company, of reviewing present practices as compared with other tried and proven methods in use elsewhere. It should be interesting information to the 27 gas companies, who report that they do not protect bare service pipe with coating where it enters the building wall, that 36 gas companies follow that practice. In answer to the question, "Is it essential that service lines be buried to a minimum depth to protect from freezing?," one would expect that in the cold areas the answers would be predominantly "yes" and particularly with manufactured gas companies where condensation is encountered, but in the Northern Section, comprising Michigan, Wisconsin, Minnesota, Montana, Wyoming, Idaho, and North and South Dakota, 6 natural gas companies and 5 manufactured gas companies answered that a minimum depth requirement was not essential. Perhaps, the reason for this attitude is that the temperature falls so low that it is not practical to protect from freezing by increased depth, and therefore, extra precautions are taken to dehumidify the gas. It should be interesting, however to explore this subject further.

Joints and Couplings

Four types of joints on steel service lines are each used to a considerable extent with standard screw couplings being most popular. This is the less expensive method and, therefore, it would seem proper for the 102 companies who (at least to some extent) use heavy recessed col-

lars, welded joints or mechanical couplings, to review their practices to make certain that the benefits which are being obtained are commensurate with the added cost over the simple inexpensive screw joints.

Shut-off Valves

"Shut-off valves on Service Lines" is a subject worthy of the attention of a special subcommittee. In no other respect are the reported practices so varied throughout the industry. The reports received indicate that almost every combination of presence and absence of shut-off valves is in use somewhere. No doubt, ordinance requirements control the practice of installing shut-off valves on service lines in many instances. However, it can be said with emphasis and certainty that individual companies, and the gas industry, should give serious consideration to this problem with the intention of establishing the most desirable arrangement of shut-offs for each condition. If revisions of ordinance requirements are necessary, facts and recommendations from an authorized committee of the industry should assist materially in obtaining them. The survey reveals that the majority of reporting companies do not install shut-offs at the property line or curb on low pressure, although it obviously is a prevalent practice, particularly in the Central and Southwest Sections. An analysis of the data in this report does not support the contention that curb-cocks are used generally where meters are located inside while companies with meters located outside do not need shut-offs at the property line or curb.

On medium pressure service lines (below 15 lbs.) the practice of installing shut-off valves seems to be quite different between natural gas and manufactured gas companies. The predominate practice in natural gas companies is to install a shut-off valve only ahead of the regulator, although a large number also install a shut-off at the property line or curb. For this same type of service, the majority of manufactured gas companies install three shut-off valves; one ahead of the meter, one ahead of the regulator, and another at the property line or curb. This same practice is followed by the majority of manufactured gas companies for high pressure service lines (15 lbs. to 100 lbs.) while in the natural gas industry the principal practice seems to be to use either one shut-off valve ahead of the regulator or to install a shut-off valve at the main, as well as ahead of the regulator.

ALL SECTIONS

Practice		Number of Service Lines and Companies		
		Total All Gases	Natural Gas	Mfd. and Mixed Gas
1. What material is used predominantly for services?	Steel	11425.5 (113)	5257 (52)	6168.5 (61)
	Wrought Iron	81 (2)	0	81 (2)
	Copper	43 (1)	0	43 (1)
What materials are used but to lesser extent?	Steel	204.5 (2)	0	204.5 (2)
	Wrought Iron	657 (12)	220 (6)	437 (6)
	Copper	3314.5 (17)	1889.5 (9)	1425 (8)
	Cast Iron	773 (5)	700 (3)	73 (2)
2. If steel or iron is used, what is your preference?	Galvanized	1799.5 (25)	459 (9)	1340.5 (16)
	Black	6729 (84)	4061.5 (40)	2667.5 (44)
Coating	Hot Coat	5252.5 (37)	2894.5 (24)	2358 (13)
	Cold Coat	415.5 (8)	283.5 (5)	132 (3)
	Bare	1547 (24)	178.5 (4)	1368.5 (20)
Method of Coating	Coated on Job	468.5 (10)	258 (4)	210.5 (6)
	Mill wrapped	1694 (25)	1124.5 (16)	569.5 (9)
	Yard wrapped	2362.5 (17)	1867 (11)	495.5 (6)
3. What minimum size pipe do you use: Low Pressure	¾" Pipe	76 (2)	76 (2)	0
	1" Pipe	160 (3)	100 (1)	60 (2)
	1¼" Pipe	8949 (90)	4281 (44)	4668 (46)
	1½" Pipe	2393.5 (18)	757 (3)	1636.5 (15)
Medium Pressure	¾" Pipe	2683 (22)	1778.5 (16)	904.5 (6)
	1" Pipe	2002.5 (29)	1378 (19)	624.5 (10)
	1¼" Pipe	4914 (35)	873 (9)	4041 (26)
	1½" Pipe	43 (2)	0	43 (2)
High Pressure	¼" Pipe	19.5 (2)	0	19.5 (2)
	¾" Pipe	5684.5 (53)	2189 (19)	3495.5 (34)
	1" Pipe	2013 (27)	1294.5 (17)	718.5 (10)
	1¼" Pipe	976.5 (9)	457.5 (7)	519 (2)
4. What type or types of joints are used for steel service?	Standard Screw	4551 (52)	1172 (20)	3379 (32)
	Recessed Screw	3658 (46)	1716 (22)	1942 (24)
	Welded	3192 (39)	1978 (26)	1214 (13)
	Mechanical	2155 (17)	405.5 (5)	1749.5 (12)
5. What method of joining and connecting is used for copper pipe?	Solder	2248.5 (10)	1280 (5)	968.5 (5)
	Rubber joint couplings or fittings	1800.5 (10)	529.5 (4)	1271 (6)
	SAE Fittings	1867 (8)	442 (3)	1425 (5)
6. If bare pipe is used, is it protected at building wall by coating?	Yes	2537.5 (36)	1014.5 (13)	1523 (23)
	No	3224 (27)	1433 (10)	1791 (17)
7. Do you ever install cathodic protection on service lines?	Yes	459 (6)	459 (6)	0
	No	11152.5 (110)	4799 (44)	6353.5 (66)
8. Do you insulate service lines from the distribution main system?	Yes	3422 (20)	1699.5 (8)	1722.5 (12)
	No	8119 (97)	3531 (45)	4588 (52)
If so, where?	At the main	1460 (10)	168 (4)	1292 (6)
	Outside building	1792 (7)	1637 (6)	155 (1)
	Inside building	1130.5 (8)	0	1130.5 (8)
9. Do you use rubber joint couplings on services?	Yes	8859 (67)	3555 (36)	5304 (31)
	No	2171.5 (38)	1164.5 (14)	1007 (24)
Are rubber joint fittings used?	Yes	6446.5 (42)	1807 (14)	4639.5 (28)
	No	1617.5 (26)	1021 (13)	596.5 (13)
10. What is your predominant practice for connecting to the main? For Cast Iron Mains	Saddle	1224.5 (12)	1128 (7)	96.5 (5)
	Tap	7805.5 (76)	2295.5 (30)	5510 (46)
	Both tap and saddle	1353 (16)	736.5 (6)	616.5 (10)
For Steel Mains	Saddle	2124 (25)	786 (7)	1338 (18)
	Tap	1185 (5)	600 (1)	585 (4)
	Weld	6015 (52)	2746 (31)	3299 (21)
11. Are your meters predominantly inside or outside of buildings?	Inside	9051 (85)	2780.5 (25)	6270.5 (60)
	Outside	2525.5 (31)	2442 (26)	83.5 (5)
12. If building has no basement, do you require that service terminate inside of building?	Yes	7269.5 (65)	1760 (16)	5509.5 (49)
	No	1451.5 (15)	972.5 (9)	479 (6)
If not, do you require shelter for meter?	Yes	1386.5 (15)	874.5 (9)	512 (6)
	No	2620 (30)	2536.5 (25)	83.5 (5)

Upon investigating the rather prevalent practice of manufactured gas companies to install a shut-off valve ahead of each meter, in addition to one located ahead of the regulator, it would seem that this practice is probably followed because of the use of the same meter bar equipped with a stop cock for medium pressure and high pressure installations as is used on low pressure; whereas, in the natural gas industry it is a more common practice to use the less expensive meter bars without stop cocks on medium pressure and high pressure installations. The data in this report on shut-off valves must be considered somewhat general, but at the same time, indicative of the complexity of this problem. A more comprehensive review of this particular subject is recommended and should produce some very enlightening and helpful information.

Service Stoppages

The answers to the question about service stoppages reveal that it is a troublesome problem with a large number of companies and a major problem in many cases, particularly with companies distributing manufactured gas. The answers indicate that the use of vacuum and steel snakes is considered as the most satisfactory methods of removal by many companies.

Pipe and Coatings

Steel pipe is used predominantly for service lines throughout the industry, with copper being the next most popular material. About three quarters of the steel pipe used is black and about one quarter is galvanized. A large majority of steel pipe is protected with a coating applied while hot. Only a small percentage of the coatings is applied on the job. The

ALL SECTIONS—*Continued*

Practice		Number of Service Lines and Companies: Total All Gases	Natural Gas	Mfd. and Mixed Gas
13. Do you use ordinary IBBC stop cocks for all shut-off purposes on all services?	Yes	5314 (68)	2793 (35)	2521 (33)
	No	6082 (46)	2404.5 (16)	3677.5 (30)
If not, what other kinds of valves or stop cocks are used and for what conditions?	Plug Valves on MP & HP	3332.5 (25)	1323 (9)	2009.5 (16)
14. Please indicate your predominant practice for installation of shut-off valves or cocks on service lines.				
Low Pressure:				
Ahead of meter		6495.5 (67)	2743 (26)	3752.5 (41)
Ahead of meter and at property line or curb		4084 (36)	1848.5 (20)	2235.5 (16)
Other		899.5 (9)	661 (4)	238.5 (5)
Medium Pressure:				
Ahead of meter, ahead of regulator, and at property line or curb		3535 (20)	440 (4)	3095 (16)
Ahead of regulator and at property line or curb		1249.5 (15)	954 (11)	295.5 (4)
Ahead of regulator		2010 (20)	1690.5 (13)	319.5 (7)
At main and elsewhere		1454 (15)	270 (8)	1184 (7)
Other		2009.5 (19)	1215 (11)	794.5 (8)
High Pressure:				
Ahead of meter, ahead of regulator, and at property line or curb		3245 (20)	453 (3)	2792 (17)
Ahead of regulator		1470 (13)	1273.5 (7)	196.5 (6)
Ahead of regulator and at property line or curb		1130.5 (17)	721 (8)	409.5 (9)
At main and elsewhere		2814 (27)	1553.5 (18)	1260.5 (9)
Other		660 (13)	311.5 (7)	348.5 (6)
15. Is service stoppage a major problem in your company?	Yes	2151.5 (25)	180 (4)	1971.5 (21)
	No	9459.5 (92)	5077.5 (48)	4382 (44)
If so, what is the predominant cause?	Frozen or condensation	219 (5)	9 (1)	210 (4)
	Napthalene and gum, with rust or dust	798 (4)	27 (1)	771 (3)
	Rust or dust	1038 (12)	42 (1)	996 (11)
16. Is it essential for service lines to be buried to a minimum depth to protect from freezing?	Yes	3996 (42)	357.5 (8)	3638.5 (34)
	No	7574.5 (67)	4869.5 (43)	2705 (24)
If so, what depth?	Less than 24"	652 (8)	27 (1)	625 (7)
	24"	1029.5 (8)	190 (2)	839.5 (6)
	30"	1817.5 (18)	89.5 (3)	1728 (15)
	More than 30"	644 (13)	51 (2)	593 (11)
17. Do you consider it essential that a careful grade exists on LP Services?	Yes	9054 (84)	2864 (24)	6190 (60)
	No	2321 (29)	2157 (24)	164 (5)
On M.P. or H.P. Services?	Yes	3482.5 (44)	400 (7)	3082.5 (37)
	No	3910 (43)	1921.5 (28)	1988.5 (15)
18. Please indicate your principal methods for installing services under pavement.				
Removing and replacing pavement		5163.5 (55)	1685 (19)	3478.5 (36)
Power driven auger		2332.5 (19)	1696.5 (14)	636 (5)
Hand auger		2031.5 (24)	793 (15)	1238.5 (9)
Pushing machine		4736.5 (48)	3035.5 (29)	1701 (19)
Driving with hand sledge		525.5 (13)	166 (4)	359.5 (9)
Driving with air hammer		3139.5 (29)	1083 (8)	2056.5 (21)
Jetting with air		995 (7)	653 (3)	342 (4)
Jetting with water		668.5 (8)	566.5 (6)	102 (2)
19. Do you test new services with air pressure?	Yes	5642.5 (45)	4255 (29)	1387.5 (16)
	No	5418 (71)	1002 (23)	4416 (48)
If so, how much pressure and for how long?				
Pressure	15 lbs. or less	2525.5 (22)	2189 (19)	336.5 (3)
	16 lbs. to 50 lbs.	1731.5 (12)	1557 (9)	174.5 (3)
	More than 50 lbs.	301.5 (6)	35 (1)	266.5 (5)
Time	20 min. or less	3477 (25)	2988 (19)	489 (6)
	20 min. to 1 hour	374 (5)	219 (4)	155 (1)
	Over 1 hour	55 (2)	45 (1)	10 (1)
20. Are service stubs installed for future customers ahead of new pavement?	Yes—general practice	1550 (25)	585.5 (9)	964.5 (16)
	Yes—limited extent	5350.5 (49)	2353 (22)	3006.5 (27)
	No	4592 (36)	2234.5 (17)	2357.5 (19)
21. Is it your present practice to supply two or more meters located at or in different buildings, rooms or basements from one service line?	Yes	4318 (46)	1883 (17)	2435 (29)
	No	6920 (62)	3019.5 (29)	3900.5 (33)

practice of application at the mill or in the yard is followed in most cases. The use of bare pipe and cold coatings seems to be more popular among the smaller companies. It is also evident that a wider use of bare pipe is made in manufactured gas companies than in the natural gas industry.

Copper pipe, where used, is joined by the use of solder, rubber-joint fittings, or S.A.E. fittings, without any apparent industry-wide preference for any one of the three methods over the others except that all companies in the Pacific Coast Section, using copper, reported that they used solder connections.

Five companies in the Southwest and one in the Northern Section reported the use of Cathodic Protection for service lines. Apparently, this practice is not followed in other sections of the country, although a few reported that they are planning for its use.

The practice of insulating service lines from the main distribution system is followed by 20 companies operating more than 3 million service lines. Some of them insulate at the main, others outside of the building, while several report that they insulate inside of the building. This general practice of placing insulating devices on service lines is probably related to problems of electrolysis, galvanic corrosion, and other factors. It would seem that in each distribution system a different set of conditions would prevail and might influence the decision of whether or not service lines should be insulated. It is possible that this general subject is one worthy of additional study.

Rubber-joint couplings and fittings are used extensively in almost every part of the country. Welding on steel mains and tapping on cast iron mains are the most popular methods of connecting services.

Location of Meters

A rather definite conclusion can be drawn in regard to the relation of climatic conditions to the problem of locating meters inside or outside of buildings. Generally speaking, meters are located inside of buildings on the North and outside South of a line drawn across a map of the United States roughly bounded on the North by the States of Oregon, Idaho, Colorado, Kansas, Missouri, Kentucky and North Carolina.

The answers to the question, "If a building has no basement, do you require that service terminate inside of building?," indicates that usually companies who, as a general rule, install their meters inside do not install their meters outside unless shelter is provided.

Ordinary IBBC stop cocks are used by most companies for all purposes although plug valves (lubricated in most cases) are used by many for high and medium pressures and all-brass cocks are also used by some. Not many companies report that they follow a general practice of installing service stubs for future customers ahead of new pavement improvements. The great majority either do not install them at all or, if so, only to a limited extent.

In reporting principal methods for installing service lines under pavement, more companies list removing and replacing pavement than any other practice. In the Northeast Section the practice of driving pipe with an air hammer is considerably more popular than any other method of inserting pipe through the soil. In other sections of the country, the use of pushing machines, and augers (both hand-driven and power-driven) are favored.

It is apparent, from the answers received, that almost all companies look with disapproval upon the practice of supplying two or more meters, located at or in different buildings, rooms, or basements, from one service line. The tabulation of these answers was quite difficult because in almost every instance the answers were qualified to a certain extent. For instance, one company permits a branch service to serve "Two buildings on the same lot, or with easement for service line between two lots." Another company reports that a branch service may be installed "If all buildings are on the same prop-

(Continued on page 58)

Thank You

for the New Public Interest in HOT WATER!

TIMES HAVE CHANGED, standards are raised — and you've improved them. The gas age comes magnificently into its own.

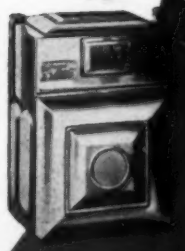
The service you've given, the appliances you've made available, have developed *a new appreciation of hot water.*

Now your public is beginning to think as you think — in terms of social good.

Now people want extra bathrooms, dishwashing machines, home laundries, *for health as well as comfort.*

In the future, public gas utilities will make hot water possible in greater quantities, at controlled temperatures, to lift the public standards even higher.

That's where we come in — just as we've entered your picture so many times in the past. For American Meter Company and the manufactured natural and LP gas industry are friends of long standing. We've planned together — made progress together — on many occasions since 1836. You'll know where to find the time-proved, field-proved *measurement engineering for all your plans which lie ahead.*



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it's so certain and
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You'll love the new Universal Gas Ranges with their dozens of features that will modernize any kitchen and make cooking a pleasure. Ask your dealer to show you all the latest Universal Gas Range models — each one engineered with the latest improvements for greater ease in providing you with more economical home meals.
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Models Built to "C-P" Standards Contain Automatic Lighting of All Burners.
Completely Automatic Models Available—Start and Stop by the Clock.
Beyond the city mains, Universal Gas Ranges are especially designed for use with "L-P" (tank or bottled) gas.
Write for FREE book on new UNIVERSAL GAS RANGES.
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36,000,000 SALES MESSAGES . . . MOSTLY IN 2 AND 4 COLORS!

Water Heating Council

Pacific Coast Gas Association and Other Councils Discuss Policies

By
Fred A. Herr

MEETING in Los Angeles in March, the Water Heating Council of the Pacific Coast Gas Association voted to sponsor the preparation of a series of commercial sizing charts and installation information booklets designed to promote the use of adequately sized and properly installed gas water heaters in hotels, auto courts, apartment houses, restaurants and other large volume users of hot water.

Decision to expand its sizing and educational program into the commercial water heater field was reached following a review given at the Los Angeles conference by Clyde H. Potter, Southern Counties Gas Co. and council chairman, on the phenomenal success attained with the domestic water heater sizing chart which the PCGA introduced two years ago.

The domestic water heater sizing chart and the effective program of promotion with which it was introduced to the industry, Mr. Potter reported, has had a material effect in discouraging the use of 20-gallon water heating units and inducing appliance dealers, plumbers and others who merchandise appliances to promote the sale of 30-gallon or larger units, using the PCGA sizing chart as a guide.

Commercial Sizing Charts

R. D. MacMahon, general supervisor of appliance sales for the Southern California Gas Co. of Los Angeles, and chairman of the Commercial Water Heater Chart Committee appointed in 1945, presented a comprehensive report on the investigation and tests the committee has conducted to determine the feasibility of preparing a sizing chart for commercial gas water heaters.

Mr. MacMahon reported that from the results of numerous tests conducted and information gathered from various sources, the committee had come to the conclusion that charts similar to those developed for domestic water heaters could be developed. He emphasized, however, that the committee was of the opinion that it will not be possible to prepare charts as simple as those for domestic heaters, but suggested the preparation of a four-page folder which would contain installation and sizing information approximately as follows:

Page 1 to contain a general presentation of the purpose of the folder together with basic suggestions for the installation of volume water heating equipment.

Page 2 to be devoted to sizing equipment for apartments, hotels, courts and large residences. The upper half of this page to contain a chart from which the requirements for hot water could be determined. The lower half of the page to present information as to the use of the chart and suggestions for installation for this type of customer.

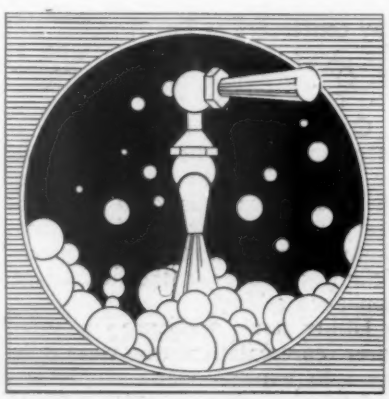
Page 3 to be devoted to hotels, with a similar chart and instructions for its use.

Page 4 (back page) to deal with hot water heater requirements for restaurants, with a chart for determining proper sizing based on average needs, information as to the chart's use and suggestions for installation.

The committee also suggested, if it is deemed advisable to do so, that additional pages could be included showing typical installations, connections, heater locations and other pertinent information.

Reports on Sizing Investigation

Comprehensive data compiled after numerous surveys, inspections and interviews had been made by the committee, on which the chart recommendations will be based, were outlined in Mr. MacMahon's report, the reading of which was accompanied by the showing of a series of slides to emphasize tables of figures and the conclusions which the committee had derived from them.



In one slide Mr. MacMahon showed water heating requirements for apartment houses based on maximum daily usage as determined from actual tests made locally. These tests were concerned primarily with daily consumption and no attempt was made to determine the maximum hourly load and the recovery capacity needs.

Mr. MacMahon reported that the test data, by the aforegoing method of approximation, revealed that the same ratio requirements, recovery and storage holds true regardless of the size of apartment houses. It was determined, he reported, that a building having four 4-room suites requires 60 gallons of hot water per day per suite; and ten 4-room suites 600 gallons per 24 hours, 120 gallon storage and 30 gallons per hour recovery.

Requirement Computation Explained

Another chart showed the hot water requirements as computed from information developed from seven different sources. Basically, Mr. MacMahon declared, they all stemmed from actual tests made in Chicago, St. Louis, New York and Portland. In all these sources the peak load was expected to last for four hours and it was found that an apartment building having five rooms to the suite and 10 suites would have a hot water requirement of 100 gallons per unit, or 1000 gallons per day, a maximum demand of 100 gallons, 200 gallons storage and 50 gallons recovery capacity.

Objective—140 Degree Water

The report stated that in reviewing all the literature and information, the committee assumed that 140 degree water should be the objective. It was also pointed out that in considering the sizing of water heaters necessary for hotels and courts, it will probably be advisable to consider the type of construction by regarding each building in a group as an individual unit, served accordingly. If the construction consisted of a long building, the committee advised, it might be practical to divide the building into two or more parts and size heaters for each part.

The report disclosed that, when considering hotels, the available information is fairly uniform. The big

question in respect to hotels, at least on the West Coast, Mr. MacMahon reported, is whether or not over-sizing of water heaters has occurred. To a degree, he said, over-sizing is advantageous in that it does not require the equipment to operate at maximum capacity for extended periods. On the other hand, is the factor of economics.

Impractical to Size Cafe Equipment

The reverse is true of restaurant requirements, as the MacMahon report declared that procedures for sizing water heating equipment for restaurants " . . . appear to be one of complete confusion." Most sources of information, Mr. MacMahon reported, based their detemination on the number of meals and the price of meals, although the number of dishes might be a common denominator. A review of restaurant hot water requirements as determined by manufacturers of dishwashers show such a wide range of divergence that it appears quite impractical to size equipment on this type of information.

Committee to Continue Work

The committee declared that while other commercial users of hot water include laundries, medical-dental offices, bars, soda fountain, meat markets, and the like, their requirements do not lend themselves to chart presentation.

The report concluded with the suggestion that the Water Heating Council give further consideration to the problem of sizing commercial water heaters, and that, while the basic information reviewed indicates a wide divergence of opinion, it appears desirable to establish certain definite requirements based on 140 degree water. These requirements, the committee asserted, can be determined by actual tests and should be representative of the various localities on the Pacific Coast.

Domestic Chart Committee Re-Appointed

The Water Heater Council also adopted a motion to re-appoint the domestic water heater chart committee and empower it to make necessary revisions in the present domestic heater chart and to have it reprinted substantially in its present form.

A suggestion that the domestic water heater sizing chart be revised for national application was voted down on the ground that there appears to be no need for uniformity nationally in this field and that the simplicity of the present P.C.G.A. chart is one of its greatest advantages, which would be nullified if the provisions were altered for nation-wide use.

Gas Heating Council Meets

The P.C.G.A. Gas Heating Council held a 2½ hour conference at Los Angeles on March 7. F. S. Parmenter, Southern Counties Gas Co., served as chairman. Discussion on the heating equipment production outlook for 1947 brought forth a consensus of opinions that there is a heavy demand for floor furnaces in all gas company areas on the Pacific Coast, but that the shortage of steel apparently will make it necessary to allocate floor furnace distribution for the greater part of the year.

Representatives of gas companies in Los Angeles, San Diego, Salt Lake City, Santa Cruz and the Pacific Northwest estimated that consumer demands for gas floor furnaces apparently will continue heavy for the balance of 1947.

In reviewing the jurisdictions of various city departments over heating installations, H. W. Geyer of the Southern Counties Gas Co., Los Angeles, stressed the need for gas industry co-operation toward prevailing upon city and county governments to confine gas appliance inspection to a single department, instead of continuing the situation currently prevalent in many communities whereby an appliance must be inspected by a representative of several municipal departments — plumbing, heating, wiring, venting, etc.

Gas appliances should be installed as a unit and inspected as a unit, not as a collection of separate parts and subject to many separate inspections, Mr. Geyer stressed.

Range-Refrigerator Council

The Gas Range and Refrigerator Council of the P.C.G.A. held an all-day conference at Los Angeles, with the range division meeting, with H. M. O'Haver of Southern California Gas Co. presiding.

Opinions elicited in a review of merchandising plans now being used or contemplated by gas utilities on the Pacific Coast disclosed the almost universally held conviction among those present that the "honeymoon" definitely is over in the field of gas appliance selling.

Utility and appliance manufacturer representatives who were called upon to express views emphasized that intensified merchandising of gas ranges and refrigerators, plus improvements in appearance and structural design of models, are imperative if the gas industry is to keep pace competitively with the electrical industry's 1947 models.

Chairman O'Haver invited a gas company representative from each of the areas of the association's territory to present a brief review of the merchandising plans contemplated or already initiated, in order that a broad picture of dealer-utility merchandising plans might be obtained.

Appliance Merchandising Plans

Presenting extemporaneous reports on that subject were Ray Phillips of San Diego Gas & Electric Co.; A. C. Miller of Pacific Gas & Electric Co., San Francisco; Clyde Potter, Southern Counties Gas Co., Los Angeles; J. G. Merkle, Southern California Gas Co., Los Angeles; G. W. Cowen, Mountain Fuel & Supply Co., Salt Lake City, Utah; and L. Wollenberger, Coast Counties Gas & Electric Co., Santa Cruz, Calif.

The reports disclosed:

That in San Diego the utility makes no appliance sales directly to consumers but channels all such transactions through dealers.

That a similar plan is followed by Southern California Gas Co. through its Blue Seal Program whereby all actual and potential appliance sales are credited or directed to the dealer in the territory in which the customer or prospect resides (See *American Gas Journal*, April, 1946, issue, Page 13).

That Southern Counties Gas Co. is following a dual policy of liberal co-operation with dealers as well as maintaining a gas company appliance merchandising staff for direct sales to customers, which force will be continued in use until the need for direct appliance sales diminishes.

That in Salt Lake City the utility's future policy will be to maintain a company sales program as well as a generous dealer co-operation plan as a permanent program.

That in Santa Cruz, Coast Counties Gas & Electric Co. will merchandise the major gas appliances in all its operating districts.

A discussion was held on the change in emphasis in Cp advertising. Consenses of manufacturer opinion was that the featuring of the brand name, rather than "Cp," as recommended by the Gas Appliance Manufacturers Association in its proposal to change the slogan to "Auto-

matic Cooking Built to Cp Standards," would be desirable from the standpoint of the manufacturers.

Women's Viewpoint on Appliances

Presenting the woman's view point on gas appliances, Miss Mercedes Bates of the Southern California Gas Company's Home Service Department, declared that Home Service Departments are more concerned with matters which cause complaints after an appliance has been sold.

Women, Miss Bates emphasized, want a range that cooks well and cleans easily. She pointed out that the Los Angeles area served by her Company contains thousands of people from other sections of the country to whom gas is a comparatively new fuel. She listed the following as desirable in new gas range models from the standpoint of appealing to housewife customers:

Minimum number of panels for improved appearance.
Improved insulation.
Valve handles that lock when not in use.
Valve handles that will not discolor.
Better and smoother inside drawers.
Improved griddles.
Pilots located for more convenient access for relighting.
Oven interiors smooth and even for easy cleaning.
Boiler compartment designed for more convenient cleaning.
Smokeless broiler pan of adequate depth and completely smokeless.

Major Causes of Trouble Cited

Miss Bates cited the following as being among the major reasons for home calls to service ranges:

Faulty ignition.
Chipped enamel.
Oven flame adjustment.
Poor broiler design.
Pilot adjustment.
Poor door fitting.
Faulty valve handles.
Drip tray does not fit.
Rack does not fit.

Replacement Plans Discussed

A report was presented at this meeting by A. M. Cramer of the James Graham Manufacturing Co. chairman of a committee appointed in June, 1947, to collect and distribute information on plans in use to replace obsolete and outmoded gas appliances.

Cramer emphasized that the electric range industry already has a definite program of replacements in operation which, varying as to the manufacturer, calls for systematic contracts with appliance owners to replace parts without charge or replace absolete models with new ones on attractive terms.

He also reviewed what various gas companies are doing to encourage the sale of gas appliances to schools and plans of appliance manufacturers along that line in areas where no utility is active.

F. S. Parmenter of Southern Counties Gas Co. reported on that firm's successful program with schools, declaring that of 109 schools contacted, 26 had already installed gas ranges.

A demonstration and presentation of the selling points of the new 1947 model Servel gas refrigerator was given at this session by F. O. Filbert, Los Angeles district manager, Sewart Abbott, Western states regional manager, and A. H. Conners, for Servel, Inc.

Appliance Installation Information

The serious need for co-ordinated information on refrigerator and general appliance installation was stressed at a meeting of the Refrigerator and Division of the Gas Range and Refrigerator Council by H. B. Payne of Southern California Gas Co. who presented a report of a committee working on the development of the New Freedom Gas Kitchen Appliance Pamphlet.

At a previous meeting of this P.C.G.A. Council, Mr. Payne, R. M. Jensen of Gordon R. Wilkins, Inc., Blair Hughes of Servel, Inc., and P. L. Speer of Southern California Gas Co. had been appointed a committee to explore the desirability of the council assuming responsibility for the preparation of a bulletin containing general specifications for the installation of ranges, refrigerators, driers and other appliances. It was hoped, Mr. Payne declared, thereby to standardize upon dimensions of appliances and cabinets.

Mr. Payne asked for discussion of the subject to provide the committee with assistance in directing future investigations. He said that, speaking for the committee, he believed that the project could be undertaken successfully and a booklet prepared that would be of material aid in developing smoother ensembles in gas kitchens by providing home owners and designers with adequate appliance and cabinet dimensions and information on their installation.

The definite need for a booklet containing specifications for installing kitchen gas appliances was expressed by a number of speakers. The general opinion was that the specifications should be presented in a general and not too complex manner, and the standing committee headed by Mr. Payne was authorized to continue its work toward that end.

*NOTHING ELSE LIKE IT!

REPUBLIC DUO-WAY
DISPOSAL UNIT

*Typical of all other fine Republic products the DUO-WAY is not just "another" disposal unit. The principle and application are NEW.

One look at the many sales features of the Republic DUO-WAY will convince you that here is a disposal unit that is DIFFERENT ... and better.

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to help you promote Gas
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Outstanding Articles of Household Interest Condensed from Leading Home and Women's Magazines
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You Can Get Decorator's Colors
For Next to Nothing
How to Use a Book with Decorative Pictures
Different from all others
STAYS SILENT, LASTS LONGER . . .
Announcing...
LOOK...
New 1947 Servel stores a bushel of frozen foods
STOP!
Servel

MAYBE today you're selling all the refrigerators you can get. But refrigerator production is stepping up fast. It probably won't be long before you'll need to do good hard selling again to get your share of the coming buyers' market for Gas Refrigeration. Customers will buy the refrigerator they've heard about the most . . . the refrigerator that's receiving the soundest, most consistent promotion *locally* as well as nationally. Here are specialized selling pieces that are designed to build interest and sales in your two biggest markets: (1) home-owners, (2) architects, builders, apartment owners. Servel's new sales aids drive home the story of Gas Refrigeration's *difference* . . . its silent operation . . . its longer wear and no moving parts. You'll find, too, that this well-rounded promotional program will help increase interest in *all* the modern services offered by the gas industry.

Mail these pieces to home-owners . . . give them to prospects in your showroom

1. **Homemaker's Digest**—Styled after the popular "digest" magazine, each full-color issue has many outstanding articles on household subjects . . . plus editorials that dramatize the modernity of Gas Refrigeration.
2. **1947-Line Folder**—Displays and describes each of the five newest models . . . and tells why the Servel Gas Refrigerator is "Different From All Others."
3. **Colorful Envelope Inserts**—Tell the Servel story of silence and no moving parts quickly and convincingly. Ideal inclosures with bills.
4. **Roto Mailer**—"STOP, LOOK, and LISTEN, and you'll agree that the great new Servel is your best investment in 1947!" That's the big story, told and illustrated by this fast-reading mailer.

Get these pieces into the hands of architects, builders, apartment owners

5. **Sweet's Catalog Inserts**—Show architects and builders how they can profit from Servel's longer service and low operating costs . . . give complete specification and installation data.
6. **Apartment House Folder**—Directed to men who buy refrigerators by the carload. This fact-filled folder shows that today's trend is toward silent Servel Gas Refrigeration.
7. **Model Sheets**—Each sheet features one of Servel's five models in full color . . . with specifications on the back. Every salesman should have a set.

New and Greater for 1947
STAYS SILENT! . . . LASTS LONGER
Servel
The GAS Refrigerator
AMERICA'S FOREMOST APARTMENT REFRIGERATOR
NEW AND GREATER FOR 1947

ACT NOW . . . WRITE TODAY!

Servel's booklets and folders can play a vital part in your effort to build a bigger gas load in 1947. For complete information, write to Servel, Inc., Evansville 20, Indiana.

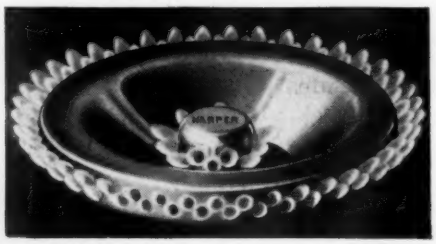
GAS REFRIGERATOR

EVANSVILLE 20, INDIANA

This is the new, improved HARPER CENTER SIMMER BURNER

HERE is the new Harper top burner that is winning widespread acclaim from the gas industry. It will find equal favor with housewives because it makes possible even better cooking results than users of the Harper Burner have enjoyed in the past.

Years of laboratory research and field tests contributed to the development of this scientifically engineered burner. The net result is that it makes possible fuel savings up to 39%, eliminates guess-work in cooking, saves pot-watching, keeps kitchens cooler, offers more healthful, less wasteful cooking . . . cleaner, odorless cooking.



NEW, IMPROVED CONSTRUCTION!

Note how the two rows of flame ports are staggered, permitting better flame adjustment than is possible with ordinary top burners . . . flames do not "float off" or blow away . . . combustion is more efficient.

EASIER TO CLEAN!

No castings or bolts to remove . . . a slight twist removes burner for cleaning.

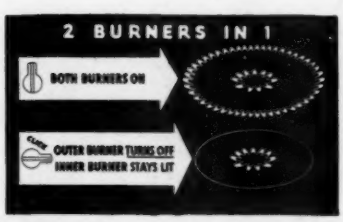
We're telling your Customers about it!

Before Buying Your
NEW RANGE
HARPER CENTER SIMMER BURNERS
The Harper Center Simmer Burners are superior to ordinary top burners because each Harper burner is really 2 burners in 1.
Only the separate Harper Center Simmer gives you the controlled low heats you need to keep foods warm for serving . . to eliminate pot watching and boiling dry . . to allow cooking with little water, which saves time and gas and keeps the average kitchen 9 degrees cooler. Only the Harper separate Center Simmer can help you so much in your cooking.
Insist on Harper Burners!
•18 Leading Gas Ranges are Harper Equipped
2 BURNERS IN 1
BOTH BURNERS ON
HARPER-WYMAN COMPANY, CHICAGO 20

A NEW CONSUMER advertising program appearing in leading women's magazines tells prospective range buyers about the advantages of the Harper Center Simmer Burner. Many of these 21,500,000 readers will buy from *you*, and here's how you can trade them up to a higher-priced range:

We have prepared a FREE booklet, "How to Sell More Gas Ranges," which contains a series of quick, convincing sales floor demonstrations that graphically illustrate the superiority of the Harper Center Simmer Burner. Send for copies for your salesmen. Harper-Wyman Company, 8561 Vincennes Avenue, Chicago 20, Ill.

The Harper Center Simmer Burner operates on the unique principle of "2 burners in 1" . . . a STARTING BURNER for frying and to start foods boiling, plus a small, economical COOKING BURNER, to maintain the cooking . . both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other top burner made.



HARPER CENTER SIMMER BURNER *". . . Holds the Lines for Gas"*

HARPER CENTER SIMMER

Natural Gas Spring Meeting of A.G.A. Held at Chicago

WITH a registered attendance of some 500 delegates, the Spring meeting of the Natural gas department of the American Gas Association was held at the Stevens Hotel, Chicago, April 30 and May 1st.

Morning and afternoon sessions were held on both days with General Sessions in the morning and open meetings of the Transmission Committee in the afternoons.

Robert W. Hendee, President of the Colorado Interstate Gas Company, Colorado Springs, and Second V.P. of the A.G.A., presided at each of the General Sessions, directed by Geo. H. Smith of the A.G.A.

H. J. Carson, chairman, Natural Gas Dept., and V.P. of the Northern Natural Gas Company, Omaha, conducted the Transmission Committee sessions.

General Sessions

Mr. Hendee, in opening the meeting with a brief address of welcome, presented George F. Mitchell, President of The Peoples Gas Light & Coke Company.

Mr. Mitchell made reference to the advent of natural gas arrival in Chicago in 1888, being carried in a 10 inch uncoated wrought iron line. It was in the late twenties, he said, when the first of the new lines were put in service, increasing to the point that 80 billion cubic feet reached Chicago during the past year. He spoke also of the accomplishments of the Institute of Gas Technology and urged the hearty support of its valuable research work conducted for the benefit of the entire industry.

R. H. Hargrove
President American Gas Assn.

H. Carl Wolf spoke for President R. H. Hargrove of the A.G.A. who was unable, to attend due to press of other important matters.

Mr. Wolf expressed his optimistic viewpoint on the present and the future outlook for natural gas, citing that the present reserves are three times as great as that already taken from the ground.

Glenn Clark, Vice President and General Counsel, City Service Gas Co., Oklahoma City spoke on the legal and economic aspects of well-head price fixing. He referred to the recent orders of the Oklahoma Commission fixing a price at the well head of not less than 7 cents per m.c.f. as compared with the going field price of approximately 4 cents.

He stated that: "In any event, it may be credibly assumed that well-head, price fixing of natural gas by a state could cause extreme difficulty in the gas rate regulatory fields of other states and of the Federal Power Commission. Conceivably, the price of gas to pipeline companies and to ultimate consumers would depend constantly upon sporadic changes in well-head prices."

J. W. Ferguson, Senior Natural Gas Engineer, U. S. Bureau of Mines, Amarillo, Texas, presented an Interim Report by the Subcommittee on Pipe Line Flow.

Copy of this report which includes a bibliography on the subject may be obtained through A.G.A. Headquarters.

"Problems of the House Heating Load" presented by Irving K. Peck, V.P. and G.M. of Manufacturers Light & Heat Co. of Pittsburgh, revealed some interesting data on this subject, now of very wide interest to the entire industry.

Robert W. Hendee

Surveys have shown that 41% of the people prefer gas for central heating.

The percentage of saturation and the expectant goal shows wide variation in the several zones here mentioned. A tabulation about as follows is in evidence for some areas.

Zones	% Saturation	% Expectancy
North East	3½	7-10
North Central	16	
(in 1 or 2 yrs.)		50-60
(in some sections)		60-75
Mid West	4-10	20-50
(Minneapolis)	38	80
Northern	40	75
North West	15	35

Mr. Peck called attention to the following:

Many companies have been hampered by transmission line or manufacturing capacity but that L.P. gas has helped in some cases when it was available. Districts served by Westchester Lighting Company and Long Island Lighting Company have 7% saturation.

There is need for improving the load factor in the summer months as the house heating demand increases. House heating may eventually become a base load. Proper installations are very important.

Comments at some length on the

subject were made by Robert Ginna, V.P. of the Rochester Gas & Elec. Corp., Rochester, N. Y. and Arthur Bridge, V.P. of the Southern Counties Gas Co., Los Angeles, Calif.

The program for the second day opened with a report on **Research and Development Progress** by H. D. Hancock, chairman of the Technical and Research Committee.

Mr. Hancock reviewed research in recent years and reported on current activities. His subjects included Gas Compressibility and Flow of Gas, Corrosion Studies and the Properties of Hydrocarbon Mixtures. Work included the activities of the Pipe Line Subcommittee on gas flow in pipe lines and the viscosity of gases at high pressures.

Seven of the students at the Institute of Gas Technology approaching degree conferrment who were in attendance were personally introduced by Dr. Parent of the Institute.

Elimination of Gas Flare Wastage was discussed in a spirited presentation by Col. E. O. Thompson, Chairman of the Railroad Commission of Texas.

Punctuating his remarks with many humorous side-lights, he felt that this is the livest subject in gas conservation and referred to the 20 states now active in the Interstate Compact Commission.

He made reference to the early efforts to secure acceptance of natural gas as a fuel at a time when many billions of cubic feet were continuously being blown to the air in the Panhandle district.

Today, he said, there is not a flare in that area with its 2700 oil wells.

The efforts to induce industries to locate at or near this unlimited source of fuel were practically fruitless. In spite of the offer of free fuel for five years there was no response. "Industry does not move to gas wells," he said, "so we brought gas to industry through pipe lines. That was a success as you men who did the job know so well.

"You gentlemen hold the key to our complete achievement of the goal public opinion has set. It is this—*the fruits of conservation must be given first place in the market for gas and the liquid hydrocarbons recovered in this conservation effort.*"

Hiram H. Dow, Chairman of the Interstate Oil Compact Commission spoke on **Conservation as Viewed by the Commission.**

The objectives of the Commission, he said, seek the conservation of gas as well as oil, by prevention of waste from any cause, and for the preservation to the States of the fundamental rights of local self-government.

"The Compact was originally executed and the Commission organized just a little more than twelve years ago with six charter members. Today it has nineteen oil and gas producing member States and one associate member. From those States come 90% of the nation's gas and 80% of the crude oil.

"Working together, the gas producing States and gas industry as a whole can eliminate every vestige of criticism, can insure that neither country nor posterity will suffer by reason of our neglect."

An Underground Storage Symposium was presented in two parts: (1) The present status and (2)—the operation of systems. L. T. Potter, Chairman of Production and Storage Committee presided.

E. H. Dahlgren, Assistant Secretary of the Oil Compact Commission, gave a complete summary of 120 storage pools located in 16 States. He included also the Government helium storage in connection with the Exell plant north of Amarillo, Texas.

Capacities and withdrawals from pools were given in considerable detail.

Mr. F. H. Hough, Executive Engineer of Southern Counties Gas Co. spoke of the benefits of local underground storage near points of consumption or load center, even in small volumes. With high pressure storage the rate of withdrawal is more effective than actual volume. Thus small volume storage can meet the need for 100 to 200 million feet per day on short notice. He drew comparisons between L.P.G. for standby and underground storage, giving cost figures and other data.

George H. Smith
Directed the General Sessions

H. Carl Wolf
Managing Director A.G.A.

Transmission Committee

The first session of this Committee opened with an address describing the "30 inch California Line" by F. A. Hough, Executive Engineer of Southern Counties Gas Co., Los Angeles.

This line originally planned as a 26 inch line* was changed to 30 inches for purposes of gas storage economy and ultimate greater capacity. Mr. Hough offered the following data:

This line from Blythe, Calif. to Santa Fe Springs will carry at the start 305 million cu. ft. of gas per day. It is expected that delivery will start in November, sixty miles having been already completed. It provides for 60 million feet of storage capacity. Pressure will be 250 lbs. at the terminal of the line which can be increased to 507 lbs. ultimately.

A movie film in color was screened showing operations in forming, welding and coating the pipe, transporting it to installation points, canal and Colorado river crossings as well as part of the El Paso Company's 26 inch line construction. This paper will be available later in print.

"Operating Experiences with Angle Type Compressors" presented by O. H. Moore, Asst. to

* *See American Gas Journal, January 1946, August 1946 and April 1947.—Ed.*

V.P., Tennessee Gas and Transmission Co. appears in this issue of the *Journal*. It was supplemented with many colored slides showing compressor station equipment including Clark, Cooper - Bessemer, Ingersoll-Rand and Worthington units.

In the discussion that followed, the author answered many questions on details offered from the floor.

Pipe Line Aerial Patrol by G. F. Leamon in charge of this activity for Northern Natural Gas and Panhandle Eastern Companies, dealt with the practicability, cost and method of air patrol.

Claims of efficiency and economy compared with ground patrol are briefly set forth in this paper which closed the afternoon's program.

The May 1st session opened with a paper on **Gas Turbine Driven Centrifugal Compressors** by E. T. P. Neubauer, Engineer of Allis-Chalmers Co. His paper was accompanied by many slides showing construction details. Such compressors could be developed, he believed, for gas transmission with relative small units and with more frequent spacing. He stated that the study as presented is "extremely limited and due to the fact that no units, of the gas turbine driven centrifugal compressor type have ever been built for gas pipe line work, no definite design conclusions can be drawn at this time." The paper brought about considerable discussion and inquiry from the floor.

Propane - Air for Shaving Peaks and Partial Standby by Carl V. Spangler of J. F. Pritchard & Co., Pittsburgh, and Al Lauderbaugh, Chief Engineer, Manufacturers Light & Heat Co., was read by the latter. He showed slides of a number of installations of complete and stand-by plants and diagrams, described methods of unloading from tank cars with Bruner pumps, and piping and control systems. He called attention to the new Underwriters requirements in spacing of five feet between tanks.

Liquefied Petroleum Gas Supply and Demand Outlook, by George R. Renz of Phillips Petroleum Co., Bartlesville, Okla., was the closing paper of the session. He referred to the pioneer work of the company and the development of this branch of the gas industry to its present status, now recognized as a major branch of the industry with unlimited outlook.

Accounting Committee. An open round-table discussion was held on April 30th under the chairmanship of F. W. Peters, Secretary - Treasurer, Oklahoma Natural Gas Co., Tulsa. Depletion accounting, tax problems, job training for accounting personnel, job evaluation, customer billing, uniform classification of accounts and classification of propane plant accounts were among the subjects discussed.

The Technical Research committee and the Managing and Advisory Committee of the Natural Gas Department held luncheon meetings on April 30th.

A visit to the Institute of Gas Technology was arranged for by E. S. Pettyjohn, Director. Many of the delegates availed themselves of the opportunity to go by special bus which left the hotel on the afternoon of May 1st. They inspected the facilities and equipment and met the personnel engaged in much of the industries fundamental research projects.

The Program Committee under the chairmanship of F. C. Brown, Natural Gas Pipe Line of America, Chicago, included A. F. Bridge, Vice - President Southern Counties Gas Co., Los Angeles; Gardner Symonds, President, Tennessee Gas Transmission Co. and C. H. Zachry, President, Southern Union Gas Co., Dallas.

Joint National Accounting Conference

Accounting problems of the nation's gas and electric utilities were searchingly analyzed and vital trends uncovered at the 1947 National Accounting Conference jointly sponsored by the American Gas Association and the Edison Electric Institute at the Hotel Statler in Buffalo, April 7-9. The many-faceted program provided nearly 700 delegates from the United States and Canada, largest registration in the history of the conferences, with the latest information in the accounting field and suggested ways to increase the present cooperation between utility accountants and management.

Smoothly running proceedings were ably directed by A.G.A. Accounting Section Chairman Leith V. Watkins, Panhandle Eastern Pipe Line Co., New York, and E. E. I. Accounting Division Chairman, H. P. Taylor, Wisconsin Public Service Corp., Milwaukee.

Murray Shields, vice-president, Bank of the Manhattan Co., a nationally known financial and economic expert, vigorously discussed economic guideposts for business planning.

"The economic danger signals are coming up," he stated, "and they call for caution in financial and inventory policies. But we have the green light for the period after the readjustments in prices have been made, and this is no time to burn the blueprints for increasing efficiency and expanding capacity to supply the great and growing demands of our economy."

James V. Toner, president, Boston, Consolidated Edison Co., urged the delegates to further the realization that utility accounting will be one of the most important aids to management in the readjustment period ahead. He said that the business accountant can and should be the right hand advisor of management.

"Too little emphasis is being placed upon showing the efficiency of business. The accountant's knowledge of these figures should be broken down, presented and interpreted so as to reveal for management the soundness or unsoundness of policy and act as a basis for future planning."

In this way, Mr. Toner said, the utility accountant will become "an instrument for increased efficiency and economy of operation—a source of income rather than an expense."

The three-day meeting of the A.G.A. Materials and Supplies Committee was attended by 14 of the 17 committe members and numerous guests. G. B. Herr, The Peoples Natural Gas Co., presided over an interesting program. Subjects covered and the speakers were as follows:

Purchasing operations—H. G. Lawrence, Southern Counties Gas Co., Los Angeles; Salvage—O. C. Peterson, New York State Electric and Gas Corp., Ithaca; Report of Stores Operations Subcommittee, L. G. Wiseley, Michigan Consolidated Gas Co., Detroit; Report of Standard Packaging Subcommittee — L. R. Michelsen, The Peoples Gas Light and Coke Co., Chicago; Stores Equipment and Building—Paper prepared by A. A. Charonnat, Pacific Gas and Electric Co., read by R. I. Highgate, Memphis Light, Gas and Water Division; Purchasing and Stores Accounting—D. M. Baker, The East Ohio Gas Co., Cleveland.

The joint Taxation Accounting meetings were directed by W. S. Alt, Union Electric Company of Missouri, St. Louis, and C. H. Mann, Columbia Engineering Corp., New York.

The general consensus at the close of the sessions was that the conference was one of the most progressive and informative yet held.

Southern Gas Assn. Elect New Officers

At the recent Annual Meeting of the Southern Gas Association, at Biloxi, Miss., the new officers elected were:

President—W. L. Woodward, Zenith Gas System, Alva, Okla.

First Vice-President—W. H. Ligon, Nashville Gas and Heating Co., Nashville, Tenn.

Second Vice President — L. L. Baxter, Arkansas Western Gas Co., Fayetteville, Ark.

Immediate Past President — Dean A. Strickland, United Gas Corp., Houston, Texas.

Treasurer—L. L. Dyer, Lone Star Gas Co., Dallas, Texas.

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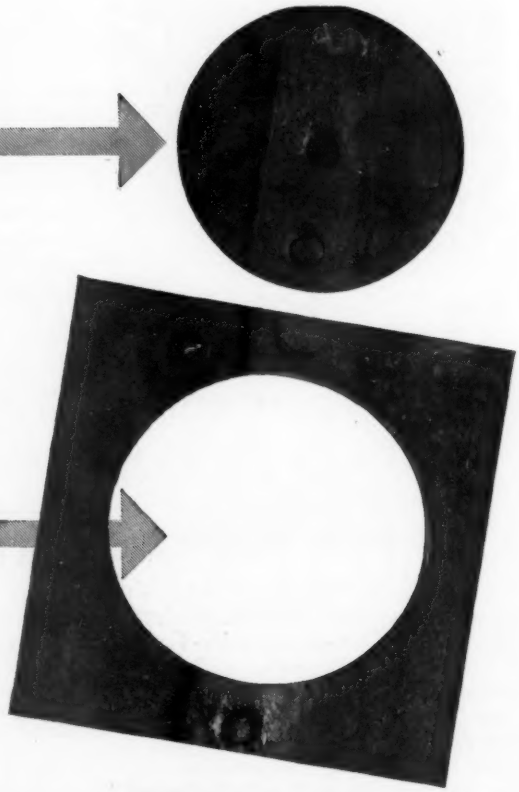

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TANKS

Operating Experiences with Angle Type Compressors

By
O. H. Moore

Assistant to Vice President
Tennessee Gas & Transmission Company
Houston, Texas

THE PURPOSE of this paper is to, first, present a brief descriptive history of the Tennessee Gas and Transmission Company's Compressor Stations; and second, to point out certain design features and to show their effect on the operation of the equipment.

Due to war time restrictions, only seven of the fourteen stations originally planned were completed in October 1944. The average spacing between stations in this construction program was approximately 168 miles. The initial capacity was 207,000 MCF of gas per day at a pressure base of 14.73 P.S.I.G. with discharge pressure at each station set at 750 P.S.I.G., and a compression ratio of 1.83. In the finished line, fifteen stations will be constructed, spaced approximately eighty-four miles apart and will operate on a compression ratio of 1.5.

Fifty-eight 1000 horsepower angle type units were installed in the original seven stations. Four new intermediate stations were constructed on the east end of the line and put into service in January 1946. Thirty-one angle type units, totaling 33,600 horsepower made up of 1000 and 1200 horsepower units were installed in these four stations.

The installation of one additional angle type unit was made in each of Stations 8 and 14 in December 1945. Eighteen angle type units, totaling 19,400 horsepower were installed in Stations 6 through 14 and placed in service during November and December 1946. Eleven stations are now in operation with a total of 113,000 installed horsepower, and three manufacturer's make of engines are represented in the 109 compressor units now in service.

Three additional stations are at present under construction on the south end of the system, and are scheduled to be in operation by mid-1947. These three stations will have a total of fifteen 1600 horsepower horizontal type units with a combined installed horsepower of 24,000.

Presented at Natural Gas Dept., A. G. A. Transmission Committee Meeting, Chicago, April 30, 1947.

The three principal factors of design, given by B. R. Bay in his paper "Compressor Station Problems" presented before the American Gas Association convention in 1934, namely:

(1) Provide plenty of good cooling water
(2) Provide correct lubrication
(3) Supply clean air for the power end and clean gas for the compressor end.

are built into each compressor station on the pipe line. Water wells with adequate supply of water and of very good quality were developed at Stations 1 through 9. Water for the balance of the stations is furnished either from rivers or reservoirs. Two enclosed jacket water circulating systems and one open system are provided at each station. One jacket water system provides for the cooling of the power cylinders, and the rate of circulation is sufficient to maintain a temperature spread of 10° F between inlet and outlet. A second enclosed system provides for the cooling of the compressor cylinders and the oil coolers. A 20° F difference in temperatures is maintained between the two enclosed systems. The circulating rate in the compressor cylinders and oil coolers was designed to have a temperature difference of 20° F between the inlet and outlet. However, in actual operation, the temperature is 6 to 10°F.

A very flexible mechanical draft cooling tower provides for both the jacket water and the main line gas. Each tower is equipped with three deep well type pumps and three circulating fans. This arrangement in the tower permits a close control on operating temperatures.

Each station is equipped with two "reclaimer" type oil filters, with one reclaimer installed in each end of the main building basement. All engine crankcases are manifolded to pipe headers which permit the filtering of the oil in each engine on the by-pass principle by simply switching valves. A schedule has been set up at each station to allow the oil in each engine to be processed a definite number of hours in the reclaimer each day. Samples of oil from the engine crankcases are sent to the laboratory at least once each month for analysis.

Table 2, "Analysis of Crankcase Oils," shows how well these reclaimers are doing their job. With the exception of one station, the crankcase oil has not been changed at any of the plants since the beginning of operation. One reclaimer of the same type as that used in the main engine room, but smaller in size, is installed in the auxiliary building for processing crankcase oils from the auxiliary engines.

Oil bath type air cleaners are installed on the free air intake lines to each engine. The advantage of these cleaners was well demonstrated at the time each station was placed in service. All vegetation in the immediate vicinity of the main building had been killed during construction, permitting a continuous dust storm under each air cleaner, until the station yards became well sodded. This dust condition was extremely heavy at Station 4, requiring repeated cleaning of the air cleaners. Even with this precaution, enough dirt was pulled into the scavenger cylinders to cause piston seizure. To keep the engines on the line, it was necessary to increase the piston to cylinder clearance. This dust trouble does not exist in the station since the

TABLE 1
ANALYSIS OF RAW WATER SUPPLY

	Mineral Substances as Determined Parts per Million										
Stations	*2*	*4*	*5*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
Silica	19.60	37.60	1.20	6.00	18.00	1.00	.20	12.80	11.00	24.60	37.00
Iron				1.80	18.20			3.60	1.00	15.40	
Alumina	1.80	1.60	19.00								11.20
Magnesium	.52	.13	.83	.32	3.77	17.25	.22	8.15	2.36	13.62	8.52
Calcium	13.63	2.00	2.00	1.20	11.02	14.04	3.61	6.52	8.42	7.22	32.48
Sodium											60.26
Bicarbonates	103.70	192.80	76.98	205.00	170.80	158.60	122.00	89.40	122.00	73.20	97.60
Carbonates			1.80	9.00							
Chlorides	60.00	50.00	36.00	30.00	16.00	10.00	10.00	12.00	14.00	30.00	42.00
Sulphates	76.53	148.55	17.69	75.22	34.01	84.35		1.65	32.09	15.22	103.69
Total Solids	435.00	345.00	328.00	378.00	303.00	222.00	165.00	145.00	223.00	230.00	300.00
P.H.	7.40	7.70	7.80	8.40	7.00	7.80	7.00		7.30	7.50	7.10
	Hardness as $CaCO_3$ gr. per G.										
Hardness	2.09	.41	.287	.24	2.53	6.31	.57	2.97	1.78	4.33	6.16

TABLE 2
ANALYSIS OF CRANKCASE OILS

		Gravity	Viscosity @ 100° F.	Viscosity @ 210° F.	Pour	Color	Neut. No.	Carbon Residue	Service Hours
Station 2	New Oil	28.9	505	62.4		2.5	.01	.01	
	Used Oil	28.0	655	69.9		3.5	.05	0	18,960
Station 4	New Oil	29.0	532	65.0	10	3.5	.06	.26	
	Used Oil	29.8		65.0		9.25	.02	.12	18,960
Station 6	New Oil	26.3	510	61	10	3.0	.05	.2	
	Used Oil	29.4	532	65.4	0	4.0	.03	.08	18,100
Station 8	New Oil	27.3	600	68.0	10	5	.02	.05	
	Used Oil	29.2	605	69.0			.13	.20	18,960
Station 9	New Oil	27.3	610	67.3	5	3	.02	.10	
	Used Oil	27.7	632	67.8	7.5		.28		7,920
Station 10	New Oil	27.9	459	59.8	5	3	.02	.08	
	Used Oil	28.4	475	62.3	5	7.5	.08	.12	18,960
Station 11	New Oil	22.3	850	66.0	10	3.5	.1	.30	
	Used Oil	22.4		63.1		6	1.5		7,920
Station 12	New Oil	27.3	610	67.3	5	3	.02	.1	
	Used Oil	27.8	611	68.1	0	6.5	.12	.17	17,160
Station 13	New Oil	29.4	698	76.1	10	4.5	.03	.26	
	Used Oil	29.4	726	77.2			.07		8,760
Station 14	New Oil	27.3	610	67.3	5	3	.02	.1	
	Used Oil	27.6	625	67.5	0	8	.08	.18	15,6802

yards have been well sodded.

The incoming gas to the compressor station passes through a battery of dust scrubbers where intimate contact is made with the incoming gas and the scrubber oil in order to wet any dust and foreign particles and prevent their passage through the system into the compressor cylinder. The gas entering the lower chamber of the scrubber causes the oil to be depressed, exposing the ends of slotted tubes. These tubes act in much the same manner as a bubble tray and cause the gas to be intimately contacted with scrubbing oil as it passes up through the tube. The gas then passes through a Mist-D-Fier section where the entrained liquid is thrown out, and the scrubbed cleaned gas leaves the scrubber through the top 12" outlet connection. The scrubber oil is continually going through a cycle of contact and draining back and in the process collects the dust and foreign matter from the gas. Oil settling tanks are provided for periodically settling of the scrubber oil from each scrubber.

Every effort was made to thoroughly clean the pipe line prior to placing it in service, but even at best a lot of foreign matter was left in the line and the scrubbers were heavily taxed at the starting of operation. One experience at No. 8 Compressor Station demonstrates rather clearly the advantages of the scrubbers. In that particular instance, so much mud, water and foreign particles were knocked out in the scrubbers, and then into the settling tanks, that the drain valves in the bottom of the tanks had to be opened and the mess turned loose on the ground after all available containers were filled. During this entire period the compressor units remained in operation and never missed a beat.

After the first month of "feeling out operation," the total gas sales were stepped up to the maximum capacity and the daily average send-out for the balance of the winter 1944 and 1945 months equalled or exceeded the estimated pipe line capacity. Valve plate breakage, compressor ring and rod packing troubles were relatively small considering that there were fifty-eight engines in full operation. Incidentally, I might add that this good fortune was rather opportune as the spare part bins were not too well stocked with repair items.

Chart No. 1, "Average Daily Gas Sales," and Chart No. 2, "Available and Installed Horsepower," show graphically the efficiency and dependability of the angle type compressor units. The actual total sales exceeded the theoretical pipe line capacity several months during the two and one half years of operation. The available horsepower almost equalled the installed horsepower during the periods of peak demand.

The advantages of properly cleaned suction headers were well demonstrated at two stations that were placed in operation in January 1946. In these particular stations, the suction header is on two elevations, the section of the header at the scrubbers is lower than the section alongside the compressor building. These headers were blown in the same manner as those at the other plants, yet valve plate, compressor ring and rod packing replacements were very heavy in comparison to the other stations. It required several additional blowings to clean the headers sufficiently to eliminate excessive cylinder wear. In a study of this problem to determine why these two plants gave so much trouble, it was revealed that these headers were loaded during very cold weather, and it is apparent that the difference in elevation of the two sections of the headers coupled with a hard freeze prevented a thorough cleaning job. This condition was not present at the other plants because the headers were loaded during mild weather.

After several months of full load operation in the initial stations, a number of engines were examined for mechanical trouble. Failures were found to vary considerably with the make of engine. The connecting rod bearings in one type engine were failing rapidly. This was found to

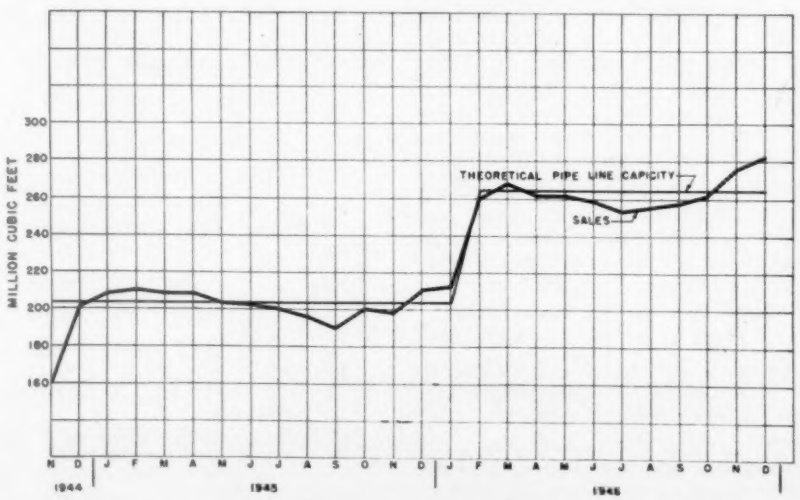

Chart 1 Average daily gas sales at 15.025 lbs. pressure base.

be caused by the bearings being too loose and was eliminated by a change in the method of tightening. The manufacturer has since furnished a new design which is proving very satisfactory.

Vibration set up in the fly wheel in one type engine at certain critical speeds, and it was necessary to install vibration dampers to eliminate this trouble. This vibration was caused by a very heavy wheel supplied by the manufacturer in order to permit a wide range of operating speed, which incidentally is not required in the operation of this pipe line system. A lighter wheel which operates through the required speed range is now being furnished by the manufacturer, and has proven very satisfactory.

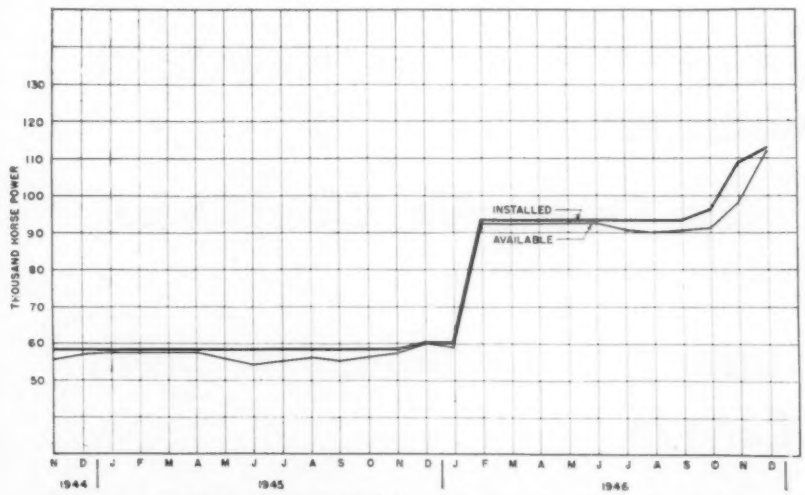

Chart 2 Available and installed Horse Power. (available horse power corrected for mechanical down time)

The scuffing of cylinders and pistons was found in another make engine which has apparently been eliminated with a change in the direction of rotation, a proper balance of the load between the power cylinders and a change in the grade of lubricating oil. It has been found in the operation of these two-cycle multi-cylinder fuel injection type engines that an unequal balance of the load between cylinders has caused the failure of rings, cylinders and pistons in the overloaded cylinders.

The exhaust pyrometer was first used as a guide to check the load condition in the various cylinders. The exhaust temperatures, however, were found to be of little value except when taken on engines equipped with dampers in the intake manifold and used in conjunction with the gas engine indicator. In fact they were a detriment until the operators found that the exhaust temperatures from a partially loaded cylinder could be the same as that from a heavily overloaded cylinder. No attempt has been made in the field to take a full pressure volume diagram with the indicator, principally because of the high speed of the engine and the complicated indicator mechanism. Pull cards showing peak pressures have been resorted to in determining the balance of load between cylinders.

In engines equipped with dampers, the peak cylinder pressures and exhaust temperatures are equalized concurrently. It has been impossible to bring about this balanced condition in the engines not equipped with manifold dampers. They should be operated with balanced peak cylinder pressure as shown by pull cards, and the exhaust temperatures used as a quick means of determining any change in the operating condition of the engine.

One particular problem found in the operation of these engines which has apparently caused cylinder failures is the clogging-up of intake ports with carbon which prevents sufficient scavenging air from reaching the affected cylinder. When loss of power is sufficient in some of the cylinders to cause too great an excess load on other cylinders, piston seizure occurs in those overloaded cylinders. Study is now under way toward reducing the oil consumption with the thought of preventing this formation of carbon. A routine inspection schedule has been put into effect in order to prevent sufficient formation of carbon to cause cylinder failures.

Mercury "U" gauges are being installed on the scavenger air manifold of each engine in order to have a running record of the scavenger air pressure. It is hoped that this record will point out any variance in the operating condition of the scavenger air system, such as clogging-up of intake ports, valve leakage at the scavenger cylinder or clogging-up of air cleaners.

Too much cannot be said about having a proper balance of load between cylinders in a multi-cylinder engine, especially where the equipment is operated at full load practically 100% of the time. There has been approximately 3¼% failure in power cylinders during the two and one half years of operation, and it is the general opinion that these failures have been caused by an overloaded condition in the individual cylinders. Power ring replacement has been 1.1%, piston rod packing 2.8% and compressor rings 3.2%. These replacements have been over the entire operating period from October 1944 through December 1946.

In conclusion, I would like to mention some of the operating incidents prevailing before and during the beginning of operation. The final main line tie-in weld in the initial construction was made in the late afternoon of October 30, 1944, and the delivery of gas from the system started in the afternoon of the 31st. This final weld was made in the first ten mile section of line east of Station 10, and at a point about one and one half miles from the Station. High pressure gas was turned into the section at about 7 p.m. on the evening of the 30th, and the block valve at the station opened within a few minutes after the section was purged and loaded. The entire section of 178.7 miles of pipe line between Stations 10 and 12 had been loaded with low pressure gas resulting in a very high gas velocity past the station when the block valve was opened. It required approximately four hours for the pressure to stabilize, at which time, the entire plant was put into operation. A false load had been placed on these engines for only a short time prior to the completion of the tie-in weld, yet the initial operation was carried out with complete success.

It might be of interest also to mention that there were only three men with previous experience in compressor station operation at this plant at the time it was put in service. The remainder of the crew had not even seen the inside of a compressor station prior to their work on the construction of the plant. There was a "do or die" spirit prevalent throughout the system and it contributed greatly to the successful operation

(Continued on page 56)

This is what

WILPUTTE

is doing at present

48—Australian Iron & Steel, Ltd., New South Wales, Australia.

177—National Tube Co., Lorain, Ohio, U. S. A.
(U. S. Steel Corporation Subsidiary)

61—Steel Company of Canada, Hamilton, Ontario, Canada.

75—Staatsmijnen in Limburg, Geleen, Netherlands.

74—Large Steel Co. in Pennsylvania, U. S. A.

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John A. Robertshaw Elected President of G. A. M. A. at Annual Meeting.

CONTENDING that a cooking appliance is more necessary to public health than other household appliances which do not have the price burden of an excise tax, members of the Gas Appliance Manufacturers Association at the annual convention at the Drake Hotel, April 14, 15 and 16, went on record as being opposed to the unfair excise tax on cooking appliances.

More than 250 representatives of appliance and equipment manufacturers attended the three day session at which problems affecting the manufacture and distribution of gas appliances were discussed in open sessions and at round table conferences.

D. P. O'Keefe, president, O'Keefe and Merritt Company, and president of G.A.M.A. presided at the general sessions and at the luncheons, where authoritative speakers on subjects ranging from taxes to hogs interested and entertained the members. Mr. O'Keefe opened the first general session on Tuesday with an encouraging report on the progress of the Association during the past year that included a strong plea for closer cooperation on the part of G.A.M.A. with the American Gas Association, particularly in the promotional and advertising fields.

Manufacturers turned out an all-time high of 1,300,000 gas-fired water heaters during 1946, Mr. O'Keefe reported and also produced 1,800,000 gas ranges in 1946, an 80 per cent increase over 1945 production but still short of 1941's all-time high.

R. H. Hargrove, vice-president, United Gas Pipe Line Company, and President of A.G.A. told the convention of the problems faced by the gas utility industry due to shortages of materials for expanding transmission and distribution facilities. He predicted that the present period of economic uncertainty is a temporary phase and that the gas industry would emerge to a stronger position than ever before.

The aggressive programs of research, advertising and sales promotion now being carried on by the gas industry were described by H. Carl Wolf, managing director of A.G.A. In closing, Mr. Wolf outlined the plans now under consideration for a concentrated campaign this fall, when the A.G.A., the gas utility companies and manufacturer members, will launch a co-ordinated drive to tell the story of the modern automatic gas range to the public. Mr. Wolf asked for the support of G.A.M.A. in assuring the success of this drive.

Howard D. White, executive vice-president, Liquified Petroleum Gas Association told the G.A.M.A. members at the general session on Wednesday that more than 763,000,000 gallons of LP-Gas were sold in rural and suburban areas in 1946, a gain of 43.1 per cent over 1945. He said 325,000,000 gallons were used for chemical purposes and 257,000,000 gallons were utilized by industry. He estimated a minimum potential of 18½ million installations in rural and suburban areas in the next five years, with rural electrification as the only serious competitor.

Postwar markets and competitive statistics were presented by Lyman L. Hill, director of sales research, Servel, Inc., and welfare and pension plans were described by I. Austin Kelly, III, director, National Employee Relation Institute, at the Wednesday general session. Luncheon speakers on Tuesday and Wednesday respectively, were Henry J. Taylor, radio commentator and author, who presented his opinion on American and European economies, backed by his experience as a war correspondent in more than 25 countries; and Colonel Jack Major, of Paducah, Kentucky, who spoke on Taxes, Ladies and Hogs, in a manner that was reminiscent of another famous citizen of Paducah, Irving Cobb.

John A. Robertshaw, president, Robertshaw Thermostat Co., was elected president of G.A.M.A., for the fiscal year beginning October 1, 1947. Frank J. Hoenigmann, executive vice president, Florence Stove Co., was elected first vice president; Frank J. Nugent, vice president, Rheem Manufacturing Co., second vice president; and John Van Norden, secretary, American Meter Company, was re-elected treasurer of the Association.

Newly Elected Division Chairman

Controls and Related Accessories Division: Chairman—John A. Wolff, Milwaukee Gas Specialty Co.

Direct Heating Equipment Division: Chairman—George H. McFadden, The Ohio Foundry & Manufacturing Co.

Domestic Gas Range Division: Chairman — A. B. Ritzenthaler, The Tappan Stove Co.

Gas House Heating and Air Conditioning Equipment Division: Chairman—C. B. Phillips, Surface Combustion Corp.

Gas Meter and Regulator Division: (Mail vote will be conducted)

Gas Refrigerator Division: Chairman—Louis Ruthenburg, Servel, Inc.

Gas Valve Division: Chairman—R. L. O'Brien, Detroit Brass and Malleable Works.

Gas Water Heater Division: Chairman—Frank J. Nugent, Rheem Manufacturing Co.

Hotel, Restaurant and Commercial Gas Equipment Division: Chair-

J. A. Robertshaw

Frank Hoenigman

Frank J. Nugent

John Van Norden

man — W. H. Rudolph, Savory Equipment, Inc.

Industrial Gas Equipment Division: Chairman—Herman Gehnrich, Jr., Gehnrich and Gehnrich, Inc.

"CP" Manufacturers Group: Chairman — E. Carl Sorby, Geo. D. Roper Corp.

Gas Boiler Group: Chairman — L. H. Hobson, General Electric Co.

Gas Conversion Burner Group: Chairman — E. A. Weaver, Surface Combustion Corp.

Gas Furnace Group: Chairman — Gene Brown, Morrison Steel Products Co.

Thirty-one new members were accepted at the meeting, bringing total membership to 462 manufacturing organizations producing 90 per cent of all gas appliances and equipment manufactured in the U. S. and Canada.

Southern Counties Gas Co. Adopts Unmetered Service To Meet Emergency

THE POLICIES of one large West Coast gas utility operating in the most populous area of California with respect to unmetered service, which is now permitted under an emergency ruling of the State Utilities Commission to combat conditions arising from the meter shortage, are outlined in a report prepared by John A. Reade of the Southern Counties Gas Company, Los Angeles.

The report cites some of the factors which were introduced by the meter shortage that had not previously been encountered by gas utilities, and explained also the procedure for establishing service and computing estimated bills which the Southern Counties Gas Company has found practical.

In the forepart of the report Mr. Reade listed the three conditions of the Commission's emergency regulations under which meters may be removed and unmetered service established. He pointed out that meters may be removed:

If, for three consecutive months the usage has not exceeded the minimum charge provisions of the general service schedule.

If usage, according to company records, is known to be either uniformly constant as to use per month, or as to use per unit of product manufactured or processed by the consumer, and may thus be estimated within reasonable range of accuracy.

If the consumer consents, the company may establish unmetered service at new installations, and may estimate the consumption at such installations from the best available data.

Reade reported that the practice Southern Counties Gas Company has established is, in instances where meters are removed under the minimum provision, to bill the consumer the monthly minimum charge under the applicable rate schedule and the estimated gas consumed entered on the meter sheet. This estimated usage, he declared, is determined from previous meter readings. In instances where meters are removed under the uniform usage provision, the consumer is required to provide such data as is necessary for the purpose of estimating monthly usage.

Unmetered New Installations

Southern Counties Gas Company, according to Mr. Reade, estimates consumption at unmetered service established at a new installation by available data and augments it by obtaining the consumer's signature on a special agreement form. Although this estimated consumption is final and can be determined only by the utility, the company obtain the consumer's signature to insure com-

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plete understanding by the consumer concerning the means of estimating consumption and preventing future difficulties arising from possible dissatisfaction.

"In order to estimate consumption for a given installation with reasonable accuracy, it is necessary to have available the results of a previously conducted survey in the territory involved in unmetered service," Reade reported. "This survey must cover a sufficient number of installations to insure representative consumption values for each of the various gas appliances in use."

Mr. Reade reported that the company has compiled a statistical table which shows the consumption of various appliances, which is used in estimating monthly bills for unmetered residential service.

The table lists monthly consumption of the various appliances in cubic feet, with the exception of heating equipment. In order to reduce heating equipment requirements to a standard workable basis, Reade explained it was necessary to introduce a constant which, multiplied by the B.t.u. input rating of the heating equipment, gives the monthly consumption in cubic feet for a given installation. He cited, for example, that a central heating plant rated at 50,000 B.t.u. input for which (by the table) the estimated consumption for the month of December can be obtained by multiplying the constant $117 \times 50 = 5.9$ MCF.

Reasonable Accuracy Obtained

"Although the values arrived at by this method cannot be said to be absolutely accurate for any given installation, due to the variations in family, size, standard of living, etc.," Mr. Reade reported, "they are sufficiently accurate for the great majority of installations. In special cases, where unusual circumstances, such as a single individual occupying the premises, who is away all day, it may be necessary to deviate from the established consumption table to allow for these conditions.

Below is shown the table used by this utility in estimating monthly bills for unmetered residential service.

Reade declared in his report that in converting an existing consumer to unmetered service, it is first necessary to insure that no leakage exists in the houseline. To accomplish this, he declared, the meter should first be tested for registration. After it has been determined that the meter is registering properly, the appliances should be shut off and a regulation meter spot made. If this meter spot shows no registration or leakage sufficiently small, as outlined in the company's policies, the meter and swivels should then be removed and the necessary pipe, including a union, installed replacing the meter.

In order that its servicemen may be able to handle high bill or leak complaints from consumers on unmetered service, the company equips them with the flexible hose connections and a test meter. To check for a leak in a houseline or appliance, this utility's servicemen remove the short connection between the regulator and the houseline and install the test meter as previously outlined. Standard procedures then are followed.

"Turn-on and turn-off procedures remain standard," Reade reported, "with the exception of the necessity of installing a test meter during turn-ons for the required leak test. Turn-offs are accomplished by removing the connection between the regulator outlet and houseline and terminating these with iron plugs or caps.

Month	*Range Only*	*Range (In Combination)*	*Automatic Water Heater*	*Refrigerator*	*Space Heating* *
January	3,400	1,600	2,900	700	*161
February	2,900	1,400	2,600	700	131
March	2,800	1,500	2,600	700	110
April	2,600	1,500	2,500	700	87
May	2,200	1,400	2,200	800	57
June	1,600	1,100	2,000	800	36
July	1,700	1,200	1,800	900	28
August	1,200	1,000	1,800	1000	—
September	1,200	1,000	1,700	1000	—
October	1,600	1,100	2,000	900	32
November	2,300	1,400	2,300	800	70
December	3,100	1,700	2,800	700	117
	26,600	15,900	27,200	9,700	*829

* Cubic feet of gas per M.B.t.u. of input capacity of heating applances. For arriving at the total M.C.F. of gas used for this purpose, the figures in this column are to be multiplied by the M.B.t.u. rating of the appliances—e.g. 117 (Dec.) by 50M. B.t.u. rating = 5.9 M.C.F.

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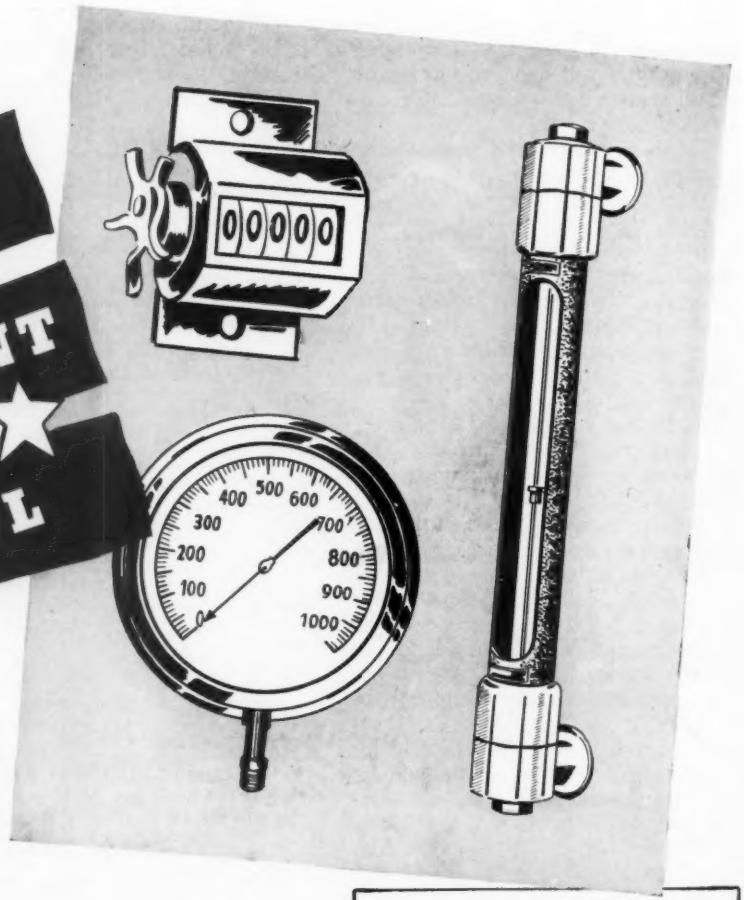

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999

How to Sell Gas in Textile Processing

By
E. V. K. Schutt
Industrial Gas Representative
Central Hudson Gas & Electric Corporation
Newburgh, N. Y.

THE TEXTILE industry, one of the largest in our country, is crying for help. They make your clothes, bed sheets, blankets, tableclothes, draperies, and thousands of other articles that require specific processing of fabrics to become a utility.

A leading textile man quotes that the problem was, is, and always will be that of drying. It is evident that the present method of drying, which is one of the most important parts of processing, is unsatisfactory so there must be a better way.

A solution that will assure us of better ways must be seasoned with the experience and knowledge of past history. The need for improvement in textile processing does not imply that the industrial gas engineer and equipment manufacturer have not done a fine job in the past.

This cry for help from the textile industry pertains to present and future needs that require greater speed in production and for better processing. Unlike most businesses, the textile industry is a prospect for most every equipment manufacturer. They need drying ovens, high pressure boilers, air heaters, immersion atmospheric and pressure burners, radiant heat, automatic heat control and safety devices. What an opportunity for equipment manufacturers! What a challenge to the gas industry to continue the trend to gas!

If a solution for better ways today should be seasoned with the experience of knowledge of the past, it will be interesting and well to know a little of the history of textiles.

History of Textile Processing

Textile is the general name applied to the products of the weaver. History records silk fabrics in China 3500 years B.C. In 1500 B.C. the Israelites knew the art of weaving, for the Bible in Leviticus speaks of the warp and woof of woolen and linen garments, their defilement from leprosy, and the necessity of their being burned by the priest. Mummy clothes from pyramids have borders of blue and fawn color which were made of threads colored in yarn.

Wool flax and cotton were all known by the Egyptians and the process of dyeing was well established. It is doubtful if our machine-made fabrics and our dyeing process will match the art of the Egyptians. Their formula of making dyes is unknown, but we are sure that the radiant heat from the sun did their bleaching and drying. It was only a little over one hundred years ago that textile fibers became of industrial and commercial importance. Cotton and wool began to lead in large amounts over flax. Next came vegetable, animal, and mineral fibers with problems of dyeing and finishing.

The radical change in textile processing came shortly after World War No. I when synthetic fibers developed rapidly and this brings us up to today's subject of "How To Sell Gas For Textile Processing." The processing of these artificial fabrics such as rayon and acetate rayons requires more exact control of temperature than does that of flax, wool and silk, and in addition increased production is now a must.

New Dry Boxes

Perhaps the greatest need in textile processing today is to find some way to dry acetate rayons such as crepe, dress goods, and similar fabrics. They are ruined in high temperatures and require controlled heat for satisfactory processing. Such cloth must be processed in ovens (not on frames) in temperatures not to exceed 250°F.

The same oven should be capable of curing dry fabrics that must be subject to 350°F. for possibly three minutes.

There is not a textile plant in our country processing acetate rayon that that had ovens capable of meeting these requirements satisfactorily.

For a generation or more several reputable dry box manufacturers have supplied the textile industry with steam heated boxes. They are specialists and know their business. This year thousands of dollars are being spent for new steamheated boxes that will sell from twenty thousand to fifty thousand dollars each. These manufacturers know that their equipment should meet the requirements, but they give no guarantee for they cannot supply higher controlled temperatures than existing steam pressures available will permit.

Gas engineers know that with proper research an oven or box can be built to meet textile wants. We should suggest properly applied radiant heat installations for they would be extremely economical of valuable floor space.

We must prove to the textile industry that we have a solution for their needs which is proper application of radiant heat wtih guaranteed temperature control. If we add to these features, a positive proof that there will be no fire hazard by using gas, a new field will be opened for the gas industry.

Old Dry Boxes Made New

Many gas burner installations are located just ahead of entrance to various forms of enclosed dryers. Speed increases of twenty percent (20%) to fifty percent (50%) are frequently obtained. The burners not only remove moisture from the material at that point, but also serve to preheat the material so that it is delivered to the oven or dryer at higher temperatures. This permits the entire travel through the oven to be utilized for drying where previously a considerable portion of this travel was used in bringing the goods up to the evaporating temperature. There is always a very limited space ahead of a dryer to accommodate this operation so it is necessary to transfer heat to the material and the water it contains in the most rapid manner possible. From actual operating tests we find the modern infra red gas burner will transfer more heat to cloth in less time and space than any other method in practical use. The prospect for selling gas for this phase of processing is tremendous; there is no competition and if the burner is properly applied the old dryer will perform better than new.

Tenter Frame Drying

In practically every textile plant you will find tenter frames of varying lengths—thirty (30) to ninety (90) ft.—used for drying fabrics having flat finishes, such as taffetas, nylons, many varieties of coat and suit linings and countless delicate

synthetic silk materials such as celanese, ninon, rayon sharkskin, etc. These materials contain thirty (30) to one hundred (100) lbs. of moisture per 100 yards and the drying speed or period to complete the evaporation is dependent on frame length or time of travel. The first method of drying this material was by radiant heat. Material was stretched on stationary frames for drying and radiant heat was applied to the fabric by moving carts ladened with red hot coals back and forth under the material. Demands for greater speed in production and better processing led to drying in the reverse, namely moving the frames and having the heat source stationary. Steam coils have been and still are the accepted source of heat for drying so, of course, steam coils were located under the cloth on tenter frames in an attempt to dry the goods as it passed through the frame. This very slow heat transfer led to the adoption of various types of gas burners.

First, the drilled pipe burner, next the ribbon burners and later, various types of pressure burners. Different combinations of blowers were also used, but it was found that large volume of air forced against the material in its wet stage had a tendency to belly the goods counteracting the tentering or stretching effect of the frame. The next step was back to steam coils again with an enclosed insulated housing. This type of equipment with circulating fans and air ducts proves quite satisfactory, but we find that a simple installation of several radiant burners frequently doubles the drying speed. If it is always necessary to add radiant heat to speed up textile processing, it is obvious that we can save the textile industry huge investments in expensive housings by first evaporating moisture with infra red heat. These synthetic resin finishes will not be injured if the material is wet when this direct fired heat is applied.

For a solution to a need, may we quote part of a letter written to the American Gas Association, January 2, 1947, from the Colonial Piece Dye Works, North Bergen, N. J.

"After the installation of two infra red burners, we were able to increase our drying speed on light quality acetate, rayons and rayon acetate mixtures by one hundred per cent (100%). We are now also able to process heavy quality goods which we were unable to dry with old type of equipment. We now run a four fibre suiting fabric consisting of aralac, cotton, wool and rayon. One advantage which we feel to be well worth mentioning is the increase in life of our Palmer blankets. These blankets cost $550.00 each. Prior to the installation of infra red equipment it was necessary to install a new blanket on an average of once every six weeks. We now find it necessary to change blankets only twice a year. This feature alone has repaid the cost of the equipment and gas used many times over."

It would pay to install infra red gas burners on every drying frame.

Singeing Cloth

Some fabrics require singeing to give them a smooth surface before they can be finished. A rather crude method was used years ago by burning coal under a sheet of metal. The material was moved rapidly against this red hot surface and a fairly good singe was obtained, but uniform heats were impossible to maintain. Electric current was applied to a similar idea, but the required speeds in production were impossible to obtain. Open flame gas burners were then applied which was some improvement, but still too slow. Next developed was a compressed flame singer that was accepted by the textile industry as a method of producing a perfect singe, but after a few years we were told by the industry it also did not produce the desired results.

With this thought in mind, the Dutchess Bleachery Company in Wappingers Falls, N. Y., experimented with infra red burners for singeing and in a short time noted a startling improvement, and a uniform and better singe that could meet the old finishers specification that cloth was singed as "clean as a hound's tooth." The old method of singeing sometimes required three or more runs through the machine before satisfactory results were obtained. Now one run is sufficient at most any desired speed.

There is no competition for gas if you will specify radiant heat for singeing.

Slasher Production Improved

Slashers are steam heated cylinders used to dry warp yarn. They are generally considered the bottleneck in production for they must move slowly in order to dry the sizing on the warp. Generally there is no temperature control and the sizing is baked. This, of course, shows up in the finished cloth. By adding one infra red burner underneath the yarn just before it passes over the steam cylinder, eighteen (18) to twenty (20) percent increase in slasher production has been recorded and a much finer product results.

Every slasher is a prospect for an open flame gas drying unit. The modern infra red gas burner has no competition for it can transfer more heat to cloth in less time and space than any other method in practical use.

Steam Cylinders

Steam cylinders are generally used for drying certain types of materials particularly cotton for sheets, tablecloths and print goods. It has been found that the addition of a limited number of burners will greatly increase the drying capacity of a battery of cylinders and help to improve quality. Actually, the various textile drying jobs involve the boiling off of large quantities of water, so by installing infra red burners under the material as it contacts the first cylinder, the drying speed is sure to be increased in a worthwhile manner.

In order to achieve high drying speeds which modern production methods require, properly applied radiant heat is the solution for you can be sure of evaporating at least two (2) pounds of water per hour per one (1) inch of burner.

Stretching and Setting Fabrics

It is very often the desire to stretch dry fabrics four (4) to eight (8) inches in width. This is done on a frame. First, steam is applied underneath the material, then in this wet condition the goods are stretched to the required width. An instant application of intense heat is then applied and the material is set and dried immediately. The only means by which this can be done successfully is by the application of infrared burners. Past experience using steam for setting this material was unsuccessful because the material was not completely dried and lost its stretch. The solution for this problem, therefore, is radiant heat. . . . .

Competition

Steam versus Gas—The roots of the present lie deep in the past. Steam has been the accepted source of heat for textile processing for generations. People simply conclude without investigation that gas is a very expensive source of heat for industrial purposes. They never consider that the greater efficiency of gas heat generating equipment to a large extent offsets higher fuel costs and that the use of gas increases the profit possibilities.

It is not sound reasoning to say that steam is cheap, without investigation. Every pound of steam requires energy and consumption of fuel. Steam costs seem to be pretty much a matter of accounting. Actual

figures for consumption of steam indicate that most drying operations require around three pounds of steam to evaporate one pound of water. Sixty cents per thousand pounds seems to be an average cost for steam so it would cost $1.80 to evaporate one thousand pounds of water from textiles under average conditions. As a comparison, manufactured gas with 535 B.T.U. per cubic foot at fifty cents ($.50) per thousand would cost $2.05 to evaporate one thousand pounds of water. (Gas costs computed at 50% efficiency—see table adjoining)

Would not substantial increased speeds in production and improved processing greatly offset this twenty-five cent ($.25) difference in fuel costs?

Electric versus Gas—Considerable amount of misinformation is given out regarding the use of electric infra red lamps for drying. One kilowatt is equivalent to 3414 B.T.U. whether used in a toaster, an infra red lamp or some other form of electric equipment. Using an efficiency of fifty per cent (50%) for comparison, it would cost $6.43 at a rate of one cent per kilowatt to evaporate one thousand (1,000) pounds of water compared with $2.05 gas at fifty cents ($.50) per thousand cubic feet. It will cost at least three times more to dry with electricity than with gas.

There is no competition at all with electricity when the question is of evaporating moisture or preheating materials. Available space for applying heat will not permit enough lamps to be installed that will generate sufficient heat to make a noticeable impression.

For example, one infra red gas burner sixty-three (63) inches long and five (5) inches wide will emit 337,000 B.T.U. at normal ratings and requires little more space than the burner size itself. This is equivalent to ninety-eight (98) KW. or 392 lamps of two hundred fifty (250) watt capacity requiring more installation space than could be satisfactorily or agreeably provided. This same idea applies to oven heating.

Source of heat	*Rate per 1000 cu. ft. of gas*	*Cost per 100,000 BTU*	*Cost per 1000 lbs. of water evaporated at 50% efficiency*
Mfgd. Gas (approx. 535 BTU per cu. ft.) per KW	.40	.075	1.65
	.50	.093	2.05
	.60	.113	2.45
	.70	.131	2.86
	.80	.149	3.29
Natural Gas (approx. 1050 BTU per cu. ft.) per KW	.15	.014	.313
	.20	.019	.418
	.30	.028	.61
	.50	.048	1.04
	.75	.071	1.37
	1.00	.095	2.10
	Rate per KW	*Cost per 100,000 BTU*	
Electricity (3414 BTU)	.01	.293	6.43
	.015	.439	9.65

The above figures are based on gross heat. No allowance is made for efficiency of lamps or burners.

Without investigation, statements have been made that direct fired infra red gas burners will harm the fibers of materials such as wool. This is not true. A recent installation of infra red gas burners was made in a Passaic, N. J., woolen mill. The operation was checked by two independent laboratories and both report that classes of goods manufactured in the plant from the lightest to the heaviest were successfully run over this equipment. Even the lightest pastel shades were not affected adversely and the carbonization improved with approximately one-third increase in production.

The only competition we have from electricity is the erroneous but popular conception that because electricity is used, therefore the operation is better.

How To Sell Gas For Textile Processing

It is a fact that the textile industry wants better ways to process. We have been told that the problem of drying is still not solved, but we now have sufficient proof that properly applied gas burning equipment is the solution. With the aid of American Gas Association advertising in textile magazines plus this knowledge of what gas can do, using equipment that has already been successfully applied, industrial gas engineers can assure textile management that gas can do their processing satisfactorily. Textile processing offers an opportunity and a challenge to the gas industry.

Presented at A.G.A. Industrial and Commercial Conference, Boston, March 17-19.

SUPERIOR GAS METERS

For Sound Values and Continuous Operating Economy

Meters for Domestic and Industrial Use. All Sizes 5B to 60C.
Wet Test and Demonstration Meters — Diaphragms —
Service Cleaners — Provers — Meter Repairs

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"Elno" Trade Mark Registered RUST PREVENTER

For Steel Hot Water Storage Tanks

Rust NO LONGER A Must!

"ELNO" eliminates the need for expensive non-ferrous or specially-processed tanks even where water is so highly-corrosive that such tanks have always been considered essential. It is not like some chemical "rust inhibitors" which merely bleach discolored water and do little or nothing to prevent rust or protect the tank. "ELNO" really routs rust, requires no attention, and causes no further expense after installation.

Get set now to tap an important new source of profit by offering your customers maximum security against rust and corrosion in the equipment you sell and service. The field is broad because "ELNO" is available in types and sizes for all makes of heaters and boilers. Write for technical, catalog, price and promotional information today.

PATENT APPLIED FOR

The Cleveland Heater Co.

2310 Superior Ave. Cleveland 14, Ohio

CLEAN, RUST-FREE HOT WATER AT LOWEST EQUIPMENT COST

Do you recommend CHORE BOY?
Should we install a CHORE BOY?
WHY GAS COMPANIES RECOMMEND THIS BURNER
CHORE BOY
REGISTERED TRADE NAME
Yes—we have tested CHORE BOY—You'll make no mistake

★ AGA CERTIFIED ★ FACTORY ASSEMBLED AND TESTED ★ RUGGED CONSTRUCTION ★ SILENT OPERATION ★ HIGHEST QUALITY CONTROLS, ALL COVERED ★ LESS SERVICE PROBLEMS ★ RELIABLE MANUFACTURER

STANDARD FUEL ENGINEERING CO.

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THE SURE WAY TO TRENCHING PROFITS

Among the many CLEVELAND pioneered features that assure trenching profits on all kinds of jobs—oil, gas, gasoline, water, sewer, conduit and drainage are:—correct, full crawler, wheel type design—smooth flowing ample power correctly applied and a wide range of transmission controlled speeds assuring the best speed for the job at hand—low operating and fuel costs—minimum maintenance expense because of superior quality materials, fine engineering and unit type construction.

With CLEVELANDS on the work you're sure too, to make real saving by meeting and beating schedules because of extreme flexibility, maneuverability and dependability.

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Home Service Workshop Sets "New High" On Mount Hood, Oregon

Sponsored By
The Home Service Committees
American Gas Association and Pacific Coast Gas Association

WITH guests and speakers from British Columbia to Southern California and one each from New York and Indiana, the "Home Service Workshop," jointly sponsored by the Home Service committees of the American and Pacific Coast Gas associations, was held April 1 and 2 in a setting of snow and ice at Oregon's famed Timberline Lodge on Mt. Hood.

By chartered bus the group left Portland the afternoon of March 31 for the two-hour scenic drive to the Lodge, twelve feet of snow, and dinner at an elevation of 6000 feet—approximately half the height of the mountain.

Thus it is believed that a "new high" was set for any "Home Service Workshop" anywhere in the United States and quite likely anywhere in the world! Rita Calhoun, home service director for Portland Gas & Coke company and this year's chairman of the P.C.G.A. Home Service committee, headed the "Workshop."

That you can still "cook with gas" even at an altitude of more than a mile was demonstrated during the "Workshop" when a Vendo "fourth zone" cooker made its Pacific Northwest debut, as did the new Bendix gas-fired automatic home laundry dryer. Bottled gas in each case was called upon to pinch hit for Portland gas.

There were two luncheons for the entire group, with the P.C.G.A. as host, and an ensemble dinner with table decorations featuring a colorful little "pipe stem cleaner" Blue Blame man on skis, the ingenious handiwork of Portland Gas & Coke Company's Frances Fricker. Also introduced at the "Workshop" was the American Gas Association's new "Miss Flame" history of the industry in comic book style.

Subjects covered during the two-day sessions ranged from kitchen planning to frozen foods and included the new as well as the long established activities of home service in the gas industry.

Speaking on "News and Views of Home Service," Miss Jessie McQueen, Home Service Counsellor, A.G.A., pointed out that new appliances and utensils, new methods of food preparation and even new foods are enlarging the field of home economics to the point where already there are more attractive positions than there are trained people to fill them.

She urged that the profession's opportunities be made known to young girls and declared that modern gas appliances in home economics departments of schools are important in glamorizing the profession.

Miss Clara Ridder, director home economics for Servel, brought her story of "Planning Unified Kitchens" up to date and described Servel's extensive research on the subject. She reported that results soon would be available in printed form. Her "chalk talk" illustrated interesting high-lights in Servel's search for the ultimate in step-saving, work-saving "New freedom" gas kitchens—a search made by actual count of steps, trips and articles carried.

Frozen foods took the spotlight at the luncheon and the second day when Keith Fenner, quality control manager for Birds-Eye-Snider Division of General Foods, spoke on "Operations Frosted." He outlined growth of the industry and told about some of its problems—including those of the reactions of various foods to freezing, the selection of a container, the matter of storage and the care and preparation after arrival in the home. He said that gas company home service departments can do the housewife a real service in helping her get the best results from frozen foods.

Again emphasizing the growing importance of kitchen planning in the field of home service, Maud Wilson, national authority on the subject and director of home economics at Oregon State Agricultural Experiment Station, spoke on "Functional Planning for Storage Space in Modern Kitchens." Pointing out that few housewives use kitchens as they were planned to be used, she urged that kitchens be planned to fit the needs, size and habits of the individual family.

A bright future for the automatic clock control on gas ranges was predicted by Gladys Price, home service director for Southern California Gas Company, Los Angeles. She outlined its history and growing popularity which was interrupted only by the war. Homemakers like the automatic clock control and will buy it, she declared, admitting that it is a challenge to home service to provide practical, complete-meal menus and otherwise educate home-makers in making full use of the automatic control.

Portland Gas & Coke company's new locally-produced sound slide film, "Hot Water Helps," made its debut at the conference and was hailed as a powerful sales tool and especially valuable in highly competitive areas. The film, in promoting automatic gas water heaters, ties in strongly with automatic home laundry equipment. The film was produced especially for use by home service counsellors and contains educational matter.

Immediately following the film, a symposium on "Home Service and Water Heater Promotion," was conducted by the Company's promotion manager, Fred M. Kimball; superintendent of utilization, D. E. Farmer; and residential sales manager, C. W. Steele. All agreed that home service girls are welcome visitors in the home and that their counsel on the subject of hot water, like cooking, is highly respected and therefore an important factor in promoting the use of automatic gas water heaters.

Reports and discussion of Pacific Coast Home Service programs, as presented by representatives from the various companies, brought out the fact that follow-up home calls after company or dealer range sales have been revived in a big way with the war's end.

AT TIMBERLINE LODGE IN THE GLARE OF THE SNOW

Many sections of the country were represented at the "Home Service Workshop." From left: Geraldine Mann of Vancouver, B. C.; Ruth Klumb of Seattle Gas Co.; Rita Calhoun of Portland Gas & Coke Co., chairman; Cristabel Anderson of Southern California Gas Co.; Jessie McQueen of the A.G.A.; and Clara Ridder of Servel, Inc.

Various group contacts are being expanded, according to the reports, with schools high on the list. Others include Girl Scouts and 4-H Clubs wth their food projects, women's clubs, brides' classes, kitchen parties and even the "road show" type of cooking and canning schools.

Other types of home service activities described at the "Workshop" included radio programs, newspaper columns, information and home planning centers, aid in sales and service training programs, and company dealer sales floor demonstrations.

Reports were given by Cleo Filsinger of Pacific Gas & Electric company, San Francisco; Herberta Peet, Portland Gas & Coke company; Geraldine Mann, British Columbia Electric Railway company, Vancouver; Ruth Klumb, Seattle Gas company; Dorothy Duncan and Katherine Rathbone of Southern Counties Gas company, Santa Ana and Los Angeles, respectively; Cristabel Anderson, Southern California Gas company, Hollywood; Thelma Fahrenkrog and Mary L. Walsh of Coast Counties Gas & Electric company, Santa Cruz and Martinez, Calif., respectively; and Margaret A. Foulds, British Columbia Electric Railway company, Victoria.

Clifford Johnstone, managing director of the P.C.G.A., and his assistant, J. E. Kern, attended the conference, as did Harry Lee, chairman of the Sales and Advertising section of the P.C.G.A. and division sales manager of Pacific Gas & Electric company's San Francisco division, who pointed out how home service fits into the 1947 sales promotion program.

George Merkle, chairman of domestic sales under Lee and general supervisor of appliance sales and promotion for Southern California Gas company, Los Angeles, lauded home service for its participation in the Range Council's search for suggestions on range improvements and reported that manufacturers have shown a real interest in some of the suggestions.

Appliance Selling Policy in Southern California

The 1947 merchandising policy of Coast Counties Gas & Electric Co., Santa Cruz, Calif., calls for direct sales of gas appliances by the company in all its operating districts as well as close dealer cooperation, according to Sales Manager L. Wollenberger.

Types of appliances being, or to be, merchandised include gas ranges, automatic water heaters, refrigerators, central furnaces, floor furnaces, circulators, radiant fires, ceiling heaters, air conditioners, clothes driers and new gas appliances requiring promotional effort. Since the firm covers the dual field of gas and electricity, it will also merchandise a considerable variety of electrical appliances.

First line gas appliances only will be displayed on all company sales floors, Wollenberger disclosed, and all appliances handled must bear the A.G.A. seal of approval. Additionally, all appliances merchandised must pass a special acceptance committee of the firm's representatives to assure performance, ease of servicing and maintenance, and sales appeal from a value standpoint.

"No merchandise will be sold by Santa Cruz Gas and Electric Co. that will tend to lower the general quality level as it exists in our communities," Wollenberger stated. "Every effort will be made to encourage all dealers to display and sell merchandise that will compare favorably in quality with that handled by ourselves. In the case of gas ranges and cookers an exception will be made where electric competition necessitates special consideration, as in the case of multiple dwelling installations. First quality appliances as applied to gas automatic water heaters is assumed to include the top three grades in the usual five price-quality range."

Santa Cruz Gas & Electric Co. also is making available a plan that permits appliances to be financed by the firm in accordance with Treasury Department Regulation W, the carrying charge on which is 5% per annum of the total transaction, less the down payment.

Under the company's present plan, installment sales not falling under the scope of Regulation W are required to make a down payment of 10% and the maximum maturity is not permitted to exceed 12 months. In no case are sales permitted to be made involving installment payments of less than $2.00 per month.

The Santa Cruz utility also will accept trade-ins on major appliances if this practice again becomes general among appliance dealers. If reconditionable, all such trade-ins, will be sold as used merchandise, otherwise, if not reconditionable, they will be scrapped.

The company's program of dealer cooperation includes six points to insure a close and mutually agreeable relation with all appliance dealers. Wollenberger announced that the following policies in this regard prevail for 1947:

1. . . . The importance of the dealer in our industry is fully recognized by Coast Counties Gas & Electric Co.

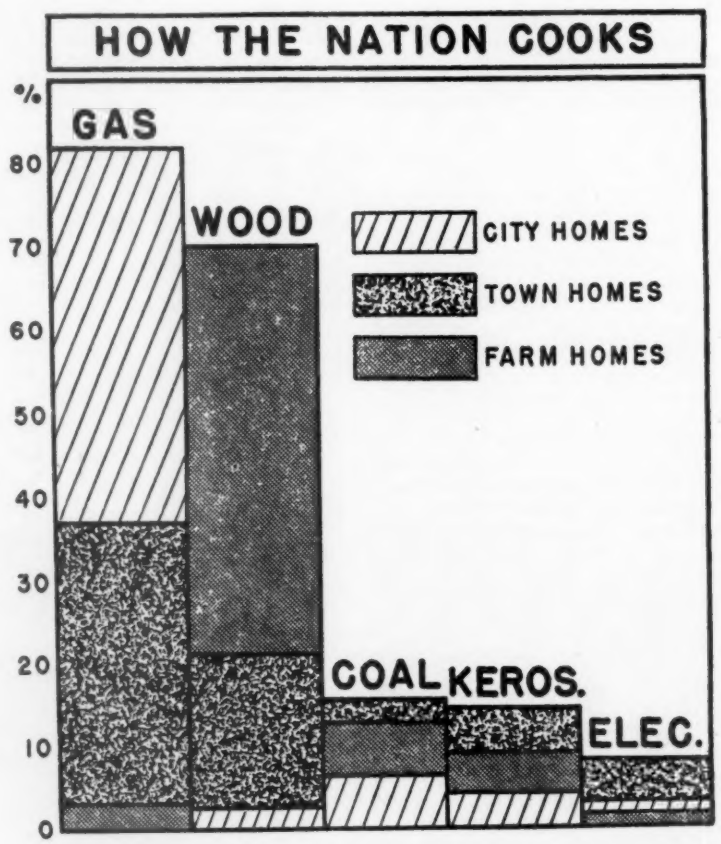
2. . . . No merchandise promotion will be undertaken by us that cannot be met or participated in by the dealer. Exception may be made in the case of promotional items of a type not handled by dealers in the area.

3. . . . No sale will be made by us with the knowledge that a dealer has had an active part in its development.

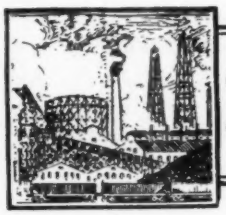
4. . . . Our sales personnel is to be available for any reasonable assistance to the dealer in the promotion of appliance sales.

5. . . . Our Home Service personnel is to be available for demonstrations on dealers' floors and for follow-up calls on dealers' range sales.

6. . . . Our sales training program is to be made available to dealers and their sales personnel.



Gas cooking acceptance loses ground as it leaves the big cities but is not overtaken by electricity even in small towns and rural areas where other fuels are still favored. Part of the answer to the higher gas acceptance as compared to electricity, in this market is LPG which has taken over about 14 per cent of the entire small-town-rural area market.



News of the Gas Industry

Gas Course Curriculum at Kingsville, Texas

Curriculum for the second annual Short Course in Gas Technology at Texas A&I College was announced in April by Dr. Frank H. Dotterweich, head of the A&I Engineering Department and chairman of the administrative committee for the course.

Sponsored by the Southern Gas Association, the course is scheduled for May 27-30, as announced in the April issue, with enrollment, other than local, limited to 150.

Twelve hours of classroom and laboratory instruction are being offered in each of the following subjects: (1) technical problems of production and transmission and (2) technical problems of gas utilization. A general assembly will be held on the first and last days to present speakers discussing trends in gas utilization and in natural gas research developments.

Classes in the production and transmission section will study pressure welding, backfills for sacrificial anodes, corrosion in condensate wells, improved methods of pipe line design, electrolytic models, and continuous well logging.

Utilization students will have presented these topics, rice drying, dehydration of farm products, design and application of submergent gas burners, advanced design and application of all-year gas air conditioning equipment, dehydration and quick-freeze methods of food preservation, and special applications of natural gas.

Instructors will be members of industry and A&I faculty members. Demonstrations will include latest gas analysis procedures using super fractionation equipment and depiction of sub-surface fluid flow utilizing electrolytic model tables.

Frank S. Kelly Jr., vice-president of the Arkansas Louisiana Gas Company, is chairman of the advisory committee appointed from industrial leaders. Frank C. Johnson, Kingsville manager of the Houston Natural Gas Corporation, is chairman of the committee on local arrangements, and Ed Slaughter, manager of the Weslaco Chamber of Commerce, heads the Valley trip committee.

Inter-Industry Cathodic Protection Committee Completes Organization

Since August, 1946, work has been in progress to organize the Correlating Committee on Cathodic Protection, an inter-industry activity to publicize and to improve procedures for handling problems arising from cathodic protection of pipe lines, communications cables, railroad signal systems and other buried metal structures. Cathodic protection is an effective retardant of soil corrosion which is damaging industrial plant to the extent of at least 200 million dollars per annum. To date eleven nation-wide organizations have taken formal action to join in the activity and have each named two representatives on the committee.

The member organizations are Association of American Railroads, American Gas Association, American Petroleum Institute, American Public Works Association, American Water Works Association, Bell System, Edison Electric Institute, International Municipal Signal Association, Inc., National Association of Corrosion Engineers, United States Independent Telephone Association, and Western Union Telegraph Company. Chairman of the Committee is H. H. Anderson, Vice President, Shell Pipe Line Corporation, and Secretary is F. E. Dolson, Engineer, St. Louis County Water Company.

As originally announced, the initial objective will be achieved by a program of education and assistance to be accomplished through the drafting of general and technical bulletins. It is planned that these bulletins will be published and distributed by each industry to its own membership.

Boyer Awarded Clark Medal by Franklin Institute

Winners of the Newcomen, the Walton Clark and the Stuart Ballantine medals of The Franklin Institute were announced March 31st by Dr. Henry B. Allen, executive vice-president and secretary. The medals were awarded at the annual Medal Day ceremonies at the Institute on April 16.

The Clark medal was awarded to Edward G. Boyer, manager at the Philadelphia Electric Company's gas department "in consideration of his notable improvements in the development of processes for reforming hydrocarbon gases and for his improved and simplified methods for calculating the required composition of interchangeable gas mixtures and for his other valuable contributions to the gas art."

Under Mr. Boyer's leadership, the Philadelphia Electric Company's gas department has pioneered in developing a process for reforming hydrocarbons. This work has resulted in more than doubling the capacity of gas production equipment and has increased efficiency and economy of operation. Many features of this development have been adopted by the remainder of the gas industry, with substantial benefits. To meet wartime peak loads, Mr. Boyer directed research by his department on mixing gases. This work provided methods for adequately supplying peak demands without excessive costs. Today fast-burning and slow-burning component gases are manufactured and expertly blended to assure maximum efficiency in appliance operation. These advances have been widely followed by the gas industry.

CONVENTION CALENDAR

May

5-9 *A. G. A. Industrial Gas School,* Hotel Seneca, Columbus, Ohio.

12-16 *A. G. A. Commercial Gas School,* Washington, D. C.

15 *New England Gas Association,* Operating Division, Hotel Sheraton, Worcester, Mass.

15-16 *Indiana Gas Association,* French Lick Springs Hotel, French Lick.

20-22 *Pennsylvania Gas Association,* Wernersville, Pa.

22-23 *Canadian Natural Gas and Petroleum Association,* Royal Connaught, Hamilton, Ontario.

27-29 *Liquefied Petroleum Gas Association,* Hotel Sherman, Chicago.

June

2-4 *Joint Production and Chemical Committee Conference,* Hotel New Yorker, N. Y.

9-11 *Canadian Gas Association,* General Brock Hotel, Niagara Falls, Ontario.

23-24 *Residential Gas Section,* New York-New Jersey Sales Conference, Essex and Sussex Hotel, Spring Lake, N. J.

July

7-8 *Michigan Gas Ass'n,* Grand Hotel, Mackinac Island, Michigan.

September

23-25 *Pacific Coast Gas Association,* Hotel Del Coronado, San Diego, Cal.

October

6-8 *American Gas Association, Annual Convention,* Cleveland, Ohio.

Wilson Mgr. Houston Division United Gas Corporation

Appointment of James A. Wilson as manager of the Houston division of the United Gas Corporation to succeed W. B. Head, Jr., who is resigning to enter business for himself, was announced today by J. V. Strange, vice president and general manager.

James A. Wilson

Mr. Wilson, in his new capacity, will direct activities of one of the largest gas distribution systems in the South. At 40 years of age, he is one of the youngest gas executives to head such a large organization.

Mr. Head has been associated with the corporation since 1940 and has served as manager of the Houston division for the past year.

"It is with deep regret and appreciation of effective and faithful service that Mr. Head's departure from the corporation is announced," Mr. Strange said. "The best wishes of the entire organization go with him into his new business."

Register of the Gas Industry British Annual

The 1947 edition of this Annual issued by Gas Times of London appears in its usual form. It includes a complete directory section of British Gas Associaitons, holding and operating companies with statistics and a technical section on gas production distribution and utilization. Daily diary pages are included and liberal advertising of products and services. Publishing office, 29 Grove Road, Leighton Buzzard, Beds.

Gas Customers of Pacific Gas & Elec. Co. Total 813,276

P. G. and E. customers increased during 1946 at a rate unequalled in the history of the company. The number of new customers totaled 86,022, including 55,618 electric users, 29,287 gas users, 1117 water and steam customers. At the beginning of 1947 the company had 1,062,723 electric customers, 813,276 gas customers and 15,677 water and steam customers—a grand total of 1,891,676.

Ginn on Board of Directors American Stove Company

Mr. Lloyd C. Ginn, advertising and sales promotion manager of American Stove Company, has been appointed to the company's Board of directors, according to an announcement today by Arthur Stockstrom, president.

Like most of American Stove Company's key executives, Mr. Ginn has risen through the ranks, beginning as an office boy 24 years ago. From 1923 to 1930, he served the New Process division of American Stove Company in Cleveland and New York. From 1930 he worked in Atlanta as sales supervisor and manager. In 1936 Mr. Ginn was appointed sales promotion manager, a position he still holds along with his advertising responsibilities.

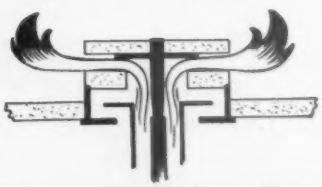
Mr. Ginn is chairman of the Domestic Range division of Gas Appliance Manufacturers Association and is a member of seven committees of American Gas Association and Liquefied Petroleum Gas Association. He attended the University of Georgia evening school in Atlanta and is a member of the international fraternity of Delta Sigma Pi and the national honorary fraternity of Delta Mu Delta.

Gas to be Featured at Home Show in California

The gas industry will play a prominent role in the Construction Industries and Home Show of Southern California which will be held in Pan Pacific Auditorium, Los

Veteran Housing

deserves the best!



Recommend the Gordon
Spreader-Flame
Conversion Gas Burner

● Made by the pioneers of the gas conversion industry. Over 100,000 in use today attest to the Gordon's dependability and satisfaction.

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"A" TYPE METERS
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DIAPHRAGMS

Cleveland Gas Meter Co.
ESTABLISHED 1875
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For Real Gas-purifying Power
CONNELLY IRON SPONGE

● To get top efficiency in gas-purification at the lowest cost, use Connelly Iron Sponge. It's the finest purification material to be had.

Connelly Iron Sponge has a high degree of activity. It gives longer service before fouling. It revivifies more quickly. Leading gas companies have been using this "blue-ribbon" purification material for years—they know it can be relied upon to do the best job.

If you have a problem in gas-purification, take advantage of Connelly's 71 years of experience. Our engineers will be glad to help you . . . there is no obligation. Consult Connelly!

CONNELLY, INC.
3154 S. California Ave., Chicago 8, Illinois
Elizabeth, N. J. Los Angeles, Calif.

Angeles, from June 12 to 22.

The Pacific Coast Gas Association is among the 14 trade and industry groups which are jointly sponsoring this second annual non-profit exhibit in collaboration with the Los Angeles Chamber of Commerce.

The Natural Gas Bureau will have the largest display in the exhibition, presented under the direction of E. L. Kern. The Bureau's exhibit in the main will follow the pattern of its 1946 display, with the latest developments in all-gas package kitchens high-lighting the displays in the kitchen setups and appliance booths. Last year the Natural Gas Bureau exhibited seven different models of all-gas kitchens, each featuring different types of gas ranges, kitchen cabinets and ensemble kitchen arrangements.

Individual gas range exhibits at this year's exposition will include Western Holly, O'Keefe & Merritt, Roper, Chambers, Wedgewood, Occidental and Gaffers & Sattler.

A model home to be exhibited will be equipped with a utility forced air gas heating system and will be piped for gas as well as wired for electricity in order to show both types of appliances.

The Merchant Plumbers Association of Los Angeles has arranged to sponsor a large booth in which gas water heaters of 12 different heater manufacturers will be exhibited.

Michigan Safety Conference

Talks by safety experts and safety directors, plus two motion pictures, will attract several hundred public utility safety men and women to the 17th annual Michigan Safety Conference which opens in Detroit, May 20.

Fred W. Bagnall, of the Detroit Edison Company, and Public Utiilties Division chairman, announces that General Motors Corporation has provided two films, "The ABC's of Hand Tools," and "The Other Fellow."

Dr. Frederic B. Knight, director of education and applied psychology, Purdue University, will speak on "The Strong Links in Human Behavior that Cause Accidents."

Another feature of the Public Utilities program will be specially conducted tours of Detroit utility companies—the Detroit Edison Company, the Michigan Bell Telephone Company, the Michigan Consolidated Gas Company, and the Public works, water supply and lighting departments of the City of Detroit.

Vice-chairman of the Public Utilities Division is Fred H. Bunnell, Consumers Power Company, Jackson, Michigan.

Cleveland Heater Company Appoints Ludlow Gen. Sales Mgr.

Kress V. Ludlow has been appointed General Sales Manager of The Cleveland Heater Company, Manufacturers of Rex Water Heaters, according to an announcement made today by Leo Friedman, President of the Company.

Kress V. Ludlow

Mr. Ludlow joined The Cleveland Heater Company as salesman in 1925 and later became district sales manager for territories served by The Columbia System and The East Ohio Gas Company. Prior to 1925 he spent several years with The East Ohio Gas Company in Cleveland, Ohio. During the war years he was in charge of war production work for the Cleveland Heater Company.

In his new capacity Mr. Ludlow will be assisted by Mr. S. C. Schnell who has been active in Rex Water Heater sales work for the past sixteen years.

Ginna On A.G.A. National Advertising Committee

Robert E. Ginna, Vice-President in Charge of Sales of the Rochester Gas & Electric Corporation, has been elected to the American Gas Association's Committee on National Advertising, succeeding Herman Russell. Mr. Ginna will represent companies contributing to the national advertising program situated in New York State, outside of the Metropolitan New York City area.

In announcing the resignation of Mr. Russell, D. P. Hartson, Chairman of the Committee on National Advertising, commented as follows:

"Mr. Russell headed the special group which raised the funds for national advertising eleven years ago. His wise counsel, his strong faith in national advertising as a prestige-building vehicle for the gas industry and his own efforts to expand this program to its present size have all served to make his record as a committee member a most distinguished one. From the beginning, the success of this program has been a matter of personal concern to him."

Atomic Power Exhibit at Mid-America Exposition

Benefits arising from research and development of atomic power to American industry and our daily life will be depicted in an exhibit, "The Atom in Peacetime," which will be the keynote feature of the Mid-America Exposition of 1947, at Cleveland, Ohio, May 22 to May 31.

With the guidance and cooperation of the Atomic Energy Commission, Washington, this atomic power exhibit will be the first comprehensive display of scientific, engineering and industrial development in the field of commercial applications, since the advent of the atom bomb.

Curran Elected Gen. Mgr. Rheem Mfg. Company

W. E. Curran has been named general manager of Rheem Manufacturing Co., as announced recently by R. S. Rheem, president. He is also a vice president and director.

Joining Rheem in 1942, Mr. Curran was made vice president in charge of production in 1943, and in February of 1946 was elected a director. He will continue to make his headquarters in New York.

CRUSE-KEMPER COMPANY
AMBLER, PENNA.
GAS HOLDERS
Low Pressure High Pressure Inspection
Purifiers Tanks Flues
Over 40 Years of Sound
Steel Plate Construction

A.G.A. Activities

Test Kitchens Used in Ventilation Study

A kitchen grease deposition study, supplementing extensive research data compiled and published on various methods of kitchen ventilation in Research Bulletin 40 last year, is under way at the American Gas Association's Technical Advisory Group for Domestic Gas Cooking Research.

Residential building trends towards smaller homes and correspondingly more compact kitchens have rapidly brought kitchen ventilation to the fore and the present study is designed to advance design techniques.

An accelerated test method is employed, six months operation of the test kitchens representing the equivalent of a year's actual use in the average home. Three kitchens have been erected in the Research Center of the Laboratories. One is a control unit with no forced ventilation provided. The other two are representative of contemporary designs, one employing the "hood" method and one employing the "Rochester" method of forced ventilation.

To date 130 cycles of cooking operations have been completed, estimated to be the equivalent of preparing 390 meals per kitchen.

Chairman of Requirements Group Appointed

George M. Nash, Utilization Engineer of the Central Hudson Gas & Electric Corporation of Poughkeepsie, New York has been appointed Chairman of the Subcommittee on Approval Requirements for Incinerators by C. H. Waring, Chairman of the Approval Requirements Committee. He succeeds Henry Behrman of the Brooklyn Union Gas Company who resigned due to ill health.

Other members of the committee are W. W. Baughman of Ohio Fuel Gas Company, Guy Corfield of Southern California Gas Company, Leland Bannister of Valley Welding and Boiler Company, E. O. Howle of Condensation Engineering Corporation and M. A. Naulin of Bowser, Inc.

Revision of present incinerator requirements to cover recent developments is now under way. The Chairman is planning an early meeting of his committee to consider their adoption.

Technical investigations of a number of important projects in the current requirements program of the American Gas Association have been completed at the Cleveland Laboratories and will shortly be reported to the interested committees requesting their conduct.

These new studies are expected to influence the trend of future requirements as well as aid materially in facilitating test procedures. They are part of the standardization program financed wholly by the Association.

Included are a newly developed accelerated procedure for low water cut-off devices which will greatly shorten the present time required to test these devices, improved test methods to determine durability of two-piece range top burners, serviceability of automatic pilots on hotel and restaurant ranges, and effects of attached duct work on performance of unit heaters.

Studies in progress include improvement of testing technique for measuring efficiency of central heating appliances, charting of performance data of thermostats used in connection with hotel and restaurant ranges and development of improved means of testing gum filters.

Three Technical Studies Completed

Three new publicaitons have been issued by the American Gas Association Testing Laboratories on technical subjects related to the Association's Domestic Gas Research program. Subjects covered are noise of extinction of large burners, bimetallic thermal elements, and domestic hot water service from gas-fired boilers.

The first is included in Research Bulletin No. 41, Research in Fundamentals of Noise of Extinction of Large Gas Burners, reporting studies supervised by the Technical Advisory Group for Burners, Controls and Accessories of the Domestic Gas Research Committee. The bulletin presents design relationships fundamental to minimizing noise of extinction in contemporary types of large burners operated on manufactured gas and includes factors affecting intensity of noise of extinction.

Effects of aerated blue and non-aerated yellow pilot flames on temperatures of flat strip bimetals under varying operating conditions are presented in Research Bulletin No. 42, A Study of Bimetallic Thermal Elements. The magnitude of permanent deformation under various loads are discussed as are results of interviews with bimetal manufacturers in the field. The investigation was supervised by the Technical Advisory Group for Domestic Water Heating Research.

The domestic hot water service publication has been issued as Laboratories Report 1060-B, Field Study of Domestic Hot Water Service from Gas-Fired Boilers. It describes the various types of equipment which have been interconnected with domestic hot water supply in order to supply year-round hot water service. Opinions of householders, gas utilities, service men, sales personnel and gas equipment manufacturers are summarized. The study was sponsored by the Technical Advisory Group for Central Gas Space Heating Research.

Your industrial gas customers should know about

the NEW **NORWALK MODEL N-50 INSPIRATOR**

This new type represents the first notable design improvement in inspirators. It can be cleaned *in less than a minute!*

Only the Norwalk N-50 makes possible these extra *plus*-advantages for your inspirator-type system:

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PLAINFIELD, NEW JERSEY

Expansion Program, Northwestern Utilities, Ltd.

Proposed expansion program of the Northwestern Utilities Ltd., Edmonton, Alberta, spread over the next five years will require an expenditure of not less than $5,000,000, according to reports presented at the recent annual meting of shareholders in Edmonton recently.

The total includes $1,686,000 for this year, providing the required 16-inch pipe is available.

H. R. Milner is president of the company, while Julian Garrett is vice-president and general manager.

The report says that during 1946, with the approval of the board of public utility commissioners and the City of Edmonton, "our general rates in the older part of the system were again reduced. This means a saving to our customers in Edmonton and the towns lying between that city and the field of approximately $260,000 per annum."

"We believe that the rates now charged for our gas are among the lowest on the continent," says the report.

"Since 1934, the average unit cost to the customer has fallen by 28.91 per cent for each 1,000 feet sold."

During the year ended December 31 last, which is the period covered by the report, the company spent $2,432,857 on capital account. Of this, $1,356,410 represents the cost of laying the six-inch and eight-inch line to the outskirts of Red Deer, the distribution systems in Camrose, Wetaskiwin, Ponoka and Lacombe and some preliminary distribution work in Red Deer itself.

In addition, five wells were drilled by the company in the Viking-Kinsella field, 12.7 miles were added to the third 16-inch main transmission line from Viking-Kinsella to Edmonton and a large amount was expended in enlarging and extending the Edmonton distribution system.

In 1946, the company had 23,376 customers, compared with 10,673 in 1934.

Appliance Training Course for Plumbers and Contractors

Consolidated Edison Company of New York, Inc., has started night courses on the installation, adjustment and starting of gas appliances. The courses are open to plumbers, heating contractors, cooperating appliance dealers and builders in the territories served by the Company.

More than 800 persons have registered in response to the invitation to attend the courses. Each class is limited to twenty individuals so that all might receive individual attention and witness the demonstrations of equipment which accompany the lectures.

Automatic gas water heaters, gas conversion burners, gas space heaters and domestic gas ranges, with piping, meters and related equipment are covered in three two-hour lectures given at the company's building at 708 First Avenue, Manhattan, by representatives of the Service Bureau of the Distribution Operation and Sales Departments.

Stookey Now President of Gas Machinery Company

At the recent annual meeting of the Board of Directors of The Gas Machinery Company, Cleveland, Ohio, Kenneth W. Stookey was elected president. He has been with the company for the past 18 years and vice president for the past three years.

William E. Steinwedell, president since 1928 and one of the founders of the company in 1902, was elected Chairman of the Board.

Joseph C. Calhoun Jr., who has been vice president of the company retains that office and in addition was elected Secretary. Theodore Schroeder continues as Treasurer of the company. All changes became effective April 1, 1947.

The Gas Machinery Company manufactures coal, water and oil gas generating equipment including auxiliary equipment. One of its outstanding achievements is the development of the twin generator oil-gas process for the production of 1,000 Btu gas—a substitute for natural gas, or where a high Btu base load gas is required. The company also pioneered and developed silicon carbide refractory radiant heating tubes and refractory rollers which are successfully utilizing gas heat for controlled atmospheres up to 2500° F.

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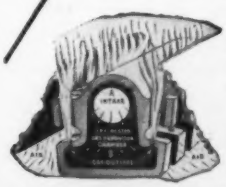

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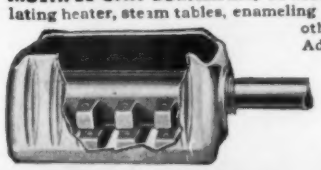
MULTIPLE UNIT BURNER may be hooked up in series to fit any type circulating heater, steam tables, enameling ovens, galvanizing tanks and many other applications. Write for circular. Address Department 10.



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NOW is the Season to arrange for inspection of distribution lines to detect leakages.

Our fully trained personnel is at your service. We can submit a complete report covering locations, source of leaks, severity of the condition and vegetation affected. We can cover any section of your lines or the complete system working on a per diem basis.

Write us regarding rates and schedules.

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GPM
IRON HYDROXIDE

The mark of unerring dependability in purification

GAS PURIFYING MATERIALS CO., INC.
3-15 26th Ave.
Long Island City 2, New York

Fifty Years of Service

On April 3rd, 1897, three small firms joined to become the B. C. Electric Railway Company, Vancouver, British Columbia.

The company operates the gas, electric and transportation utilities. As an evidence of its growth over the 50 years of service, in 1946 the gas production was 2,601,073,000 cubic feet, Electricity, 830,774,500 Kilowatt hours, Transportation, 156,045,482 passengers transported over Vancouver, Victoria and interurban lines.

Under construction now is a new 4,500,000 cu. ft. gas holder to take care of constantly increasing demands for gas.

Consumers Power Company Promotes Meter Men

Otis F. Good, Jackson Division, was recently promoted to gas meter supervisor, replacing Arthur H. Bell, who will now devote all his time to supervision of the Company's seven major gas meter shops. Mr. Bell, as general gas meter supervisor, formerly acted as Jackson Division meter supervisor also.

Mr. Good joined Consumers as a meter helper in 1929. Later he was made meter repairman and more recently chief meter repairman.

Mr. Bell will soon complete 40 years in gas meter work for Consumers and other gas companies. He first worked for the Battle Creek Gas Company in 1908. In 1910 he went to work for the Lansing Fuel and Gas Company and later worked for various gas companies in Cincinnati, Ft. Wayne, Kalamazoo, Milwaukee and Minneapolis before joining Consumers Power Company in 1918. Russell Turner, Kalamazoo; Charles Cook, Bay City; and Gilbert Bell (a son), Pontiac; all gas meter supervisors, got their early training under Mr. Bell.

Gas meters in the Company have grown from a few thousand to 261,000 at present. Jackson Division has approximately 30,000 meters and does all the repairing and testing for Marshall and the Owosso and Manistee divisions.

Boston Consolidated Names Quinn Vice President

John J. Quinn, general manager of the Boston Consolidated Gas Co. since 1937, has been named vice president, it has been announced by E. M. Farnsworth, president of the company.

J. J. Quinn

Mr. Quinn came from the presidency of the Citizens' Gas Light Co. of Quincy to the Boston company in 1930 as assistant to the vice president in charge of sales. In 1937 he became general sales manager. His first employment in the gas industry was at Pittsfield, Mass., where he was located up to 1919 when he came to Quincy.

Heating Clinic Series

A series of heating clinics for sales and service managers of firms distributing Coleman home heating equipment is in progress at the company's headquarters in Wichita, Kansas.

J. D. Eckles, director of the educational program, announced that the heating clinics would continue throughout the spring and summer months. A total of 20 clinics has been scheduled.

Special classrooms and laboratories are located in the Coleman Heating Institute building. Multiple installations of heating appliances have been provided to give those attending the clinics actual experience in trouble-shooting and servicing.

Classrooms include special demonstration equipment and individual work tables so trainees can follow the instructor as he demonstrates controls and other equipment.

Assisting Eckles are members of the Coleman Major Appliance Service Division and Herschel Houston and E. G. Johnson of the Coleman Sales Engineering department.

Dudley & Garland Represents Bryant in New England

Dudley & Garland, newly formed Boston sales engineering firm has been appointed New England representative of the Industrial Division of Bryant Heater Company, Cleveland.

The new firm, located at 176 Federal Street, will handle application of Bryant industrial gas combustion equipment in all six New England states, with the exception of southwestern Connecticut, which will continue to be served by the Bryant New York district office.

Joseph L. Dudley, a native of Massachusetts, has been associated with the engineering firms of Stone & Webster, and Jackson & Moreland. Prior to joining the new partnership, Dudley was connected with the Cochrane Steam Specialty Company.

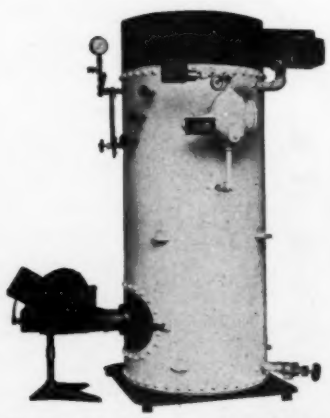
George W. Garland, born in England, was chief electrician of Walter Baker Company for a number of years, then joined the Cochrane Company as sales and service engineer.

IRON OXIDE

For purifying Manufactured Gas. How many tons do you need for Summer delivery?
I dig out Oxide during winter and spring, for summer shipments, but must know your requirements now.
Write at once
William Vennes, Grand'Mere, P.Q., Canada

THE GOODMAN STOPPER
Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.
Ask for circulars on this and other distribution equipment.
Nearly a half century of service to the Gas Industry.
The Reliable Shut-Off for Street Mains
Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

LATTNER
GAS — OIL BOILER
3 HP to 35 HP.



Burns natural gas or regular furnace oils with equal efficiency using same burner.
P. M. Lattner Mfg. Company
Cedar Rapids, Iowa

Gas Industry Exhibits at Restaurant Exposition

The thirty-two manufacturers of commercial gas cooking appliances who exhibited at the National Restaurant Exposition held in the Hotel Stevens, Chicago, March 25-28, comprised a little over 16% of all the exhibitors of all kinds of restaurant equipment and supplies. Here again was concrete evidence of the outstanding position gas equipment and gas fuel maintains in the volume cooking field.

The latest equipment for volume cooking was displayed by the major manufacturers of heavy duty gas ranges and the variety of complementary appliances left nothing to be desired. Bake ovens, broilers, deep fat fryers, toasters, coffee urns, coffee makers, steam pressure cookers, warming tables, and large kettles all utilizing gas were in evidence along every aisle and every floor of the exposition. Gas was used extensively by the several coffee concerns who were demonstrating their product.

Among manufacturers exhiibting appliances were:

American Stove Company, Anetsberger Brothers, G. S. Blodgett Company, Cleveland Range Co., Cory Corporation, Detroit-Michigan Stove Co., Lansing Manufacturing Co., Lyons-Alpha Products Co., Inc., Modern Fryer Manufacturing Co., Pitman Manufacturing Company, J. C. Pitman & Sons Sales Corp., Robertshaw Thermostat Company, Savory Equipment, Inc., A. O. Smith Corporation, Specialties Appliance Corp., Standard Gas Equipment Corp., Star Manufacturing Company, John Van Range Company.

Great interest was displayed in new glass and dishwashing equipment as a result of national agitation for more sanitary conditions in restaurants. This led to many inquiries for gas water heaters both for primary hot water and booster heaters for sterilization water.

Rudy to Manage Sao Paulo Branch for Thor Tools

Independent Pneumatic Tool Company, of Chicago, manufacturers of Thor portable pneumatic and electric tools, announces the opening of a technical office at Sao Paulo, Brazil.

E. R. Wyler, vice-president and director of the company's export division, announces the appointment of Reuben P. Rudy as manager of the new office. Mr. Rudy has been Thor representative in Brazil the past two years.

The new office is the twenty-first on Thor chain, including 18 domestic branches, and offices in Toronto, Canada, and London, England.

McCarthy Named Div. Mgr. of A. O. Smith, Corp'n.

Dennis F. McCarthy has been named Manager of the new Tubular Goods Division of the A. O. Smith Corp., Milwaukee, Wis., a division which handles the manufacture and sale of steel pipe for oil and natural gas lines and oil well casing. While the company for many years has been one of the largest manufacturers of such products, the formal establishment of the new division represents a move toward greater efficiency in one of the company's major operations. Mr. McCarthy has been in the Sales Department of the company for 11 years and has been closely associated with the sale of tubular goods since 1938.

Levine Named Managing Engineer G.E. House Heating Eqpt.

Samuel J. Levine, long associated with design and development of General Electric house heating equipment, has been named Managing Engineer of that organization's Automatic Heating Division in Bloomfield, N. J., according to a recent announcement of the company. The automatic Heating Division is a part of the Geenral Electric Air Conditioning Department. In this capacity, he will have responsibility for both engineering and manufacture of all General Electric automatic heating equipment.

Wood Named New Treasurer of Minneapolis-Honeywell

Brison Wood has been elected treasurer of the Minneapolis-Honeywell Regulator Company. Mr. Wood succeeds Willard L. Huff, who has been serving as executive vice president and treasurer. Mr. Huff will continue to serve as a director of the company and executive vice president.

Joining Minneapolis-Honeywell in March of 1942 to assist in expediting war production, Mr. Wood was elected assistant secretary and assistant treasurer the following year, which positions he has held until his election to treasurer.

Denver Establishes Record Gas Construction and Service Installations in 1946

In spite of a scarcity in materials and labor, the Gas Street department of the Public Service Company, in Denver, established a new record for gas main and service installations during the past year. Some 167,400 feet of pipe was laid for gas main. A total of 3,535 services were installed involving 295,775 feet of pipe. An average monthly installation for a full year of 300 services is a record, taking into account the many obstacles that were encountered.

For 1947, the outlook is for another year of record construction with unprecedented requirements for reenforcing the system and expanding into new territories as a result of the increased gas supply for Denver made possible under the newly-granted franchise. The new gas pipeline has been promised in time for next winter's house-heating needs.

A Firm Price Stand on Inflationary Trend

The Jas. P. Marsh Corporation of Chicago takes a firm stand against the inflationary trend of industrial pricing. In plain terms of guaranteed prices the Marsh management has declared a "firm price policy" in the sale of their products such as pressure gauges, dial thermometers, packless valves, traps, vents and related steam heating specialties. Any prices quoted henceforth during 1947 will not be subject to any increase above the prices in effect on the date the order is placed, according to the announcement.

Natural Gas Program for Indianapolis

A million dollar program to bring natural gas to the Citizens Gas & Coke Utility, municipally owned utility of Indianapolis, Ind., was started with a request for bids for natural gas sent to Texas Eastern, Kentucky Natural Gas Co., Michigan-Wisconsin Pipe Line Co., Natural Gas Pipe Line Co. of America, Panhandle Eastern Pipe Line Co., and Tenn. Gas Transmission Co., and by large display advertising in the Indianapolis daily newspapers asking for 20-year contract to begin July 1, 1948.

American Meter Co. Repair Plant at Orlando, Fla.

American Meter Company's plant for the repair of Gas Meters at 14 South Hughey Street, Orlando, Florida, started operations on February 1st, and enjoyed its official opening on March 8.

The Florida area, which this shop will serve, is under the sales management of Wm. S. Guitteau, while Wm. B. Ashby will be in charge of Production.

The facilities provided within this modern one story building are complete and up to date for the efficient repair of gas meters based on the best experience of American Meter Company factory processes devoted to repair activities.

New A.G.A. Home Service Achievement Award

New regulations providing equal opportunity for individual recognition and company awards, regardless of size, have been announced by the American Gas Association for the A.G.A. Home Service Achievement Award sponsored annually by McCall's Magazine. Cash prizes totalling $1,000 will be made in five equal awards which will be presented at the Association's Annual Convention to be held in Cleveland, October 6-8, 1947.

Home service directors and individual members of Home Service Departments of gas utility companies which are members of the American Gas Association are eligible for the awards.

Awards will be made for the year ending July 31, 1947, in three divisions as follows:

Division A—For companies with more than three persons in the Home Service Department. $200 to the home service director and a bronze plaque for the company.

Division B—For companies with at least one but not more than three home service representatives. $200 to the home service director and a bronze plaque for the company.

Division C—Three awards of $200 each and a bronze plaque for the company will be made to the individual members of the Home Service Departments of three different companies whose ideas have contributed most to the advancement of modern home-making through the use of gas equipment. Such advanced thinking might encompass a dream idea, a project in the formative stage, or a modernized version of any home service activity.

All home service personnel may enter one or any of the three divisions but only one award will be made to an individual or company. Contestants are requested to eliminate all identification from the material submitted but to send their names, companies and division entered on a separate sheet.

Entries must be postmarked not later than July 31, 1947 and should be addressed to American Gas Association, 420 Lexington Ave., New York 17, N. Y.

A.G.A. Gas Heating Progress Award

Individuals who have made outstanding contributions to the advancement of gas house heating will receive a total of $1,000 in cash prizes this year in a new annual contest conducted by the American Gas Association and sponsored by The Coroaire Heater Corporation. Winners of the A. G. A. Gas Heating Progress Award as it is known will be announced at the Annual Convention of the Association to be held in Cleveland, October 6-8, 1947.

Purpose of the award is to give public recognition to those individuals who have done most to create, maintain and increase consumer demand for gas heating. It is open to any executive or employee of any gas utility, holding or service company member of the American Gas Association, or any individual members of the Association with the exception of employees of gas appliance manufacturers.

Five awards will be made as follows: first, $500; second, $250; third, $150; fourth, $50; and fifth, $50.

The initial awards in this annual contest will be made to those individuals who have made the greatest contribution during the period of July 1, 1946 to June 30, 1947. Entries must be postmarked not later than June 30, 1947 and should be addressed to the American Gas Association, 420 Lexington Avenue, New York 17, N. Y.

Bertholf Named Manager of Bryant Branch Office

Bryant Heater Company announces the opening of a new branch office in Cleveland with Phil D. Bertholf as manager. The new branch office will handle distribution of Bryant products for the Northeastern Ohio area.

Bertholf comes to his new post from the main Bryant plant in Cleveland, where since 1945 he has directed allocations of manufactured products to Bryant's 43 distributors throughout the United States. Previously he was assigned to Bryant's London Road plant in Cleveland to assist in the company's War Building Program.

He first joined Bryant in 1937 as Southern Division Sales Manager in the company's Chicago sales organization. There he had charge of all sales and service activities as related to Bryant products for a group of midwestern utilities.

Extension of "Inch" Lines Service Opposed by P.S.C.

On May 2nd, the New York State Public Service Commission expressed opposition to proposals for the extension of the supply of natural gas from "Big Inch" and "Little Inch" lines to new areas or to additional industrial customers "until it is certain beyond any reasonable doubt that the supply of gas to present residential customers in New York State will be ample under the most adverse weather conditions."

The Commission's position was made known in a letter by Chairman Milo R. Maltbie of the New York Commission to the Federal Power Commission upon information that Texas Eastern Transmission Corporation has applied to the F. P. C. for a certificate to operate "Big" and "Little Inch" pipe lines and for permission to construct additional pipe lines to serve new areas.

Recalling the serious gas shortages which occurred in New York State last winter, Chairman Maltbie warns that conditions may be even worse next winter and goes on to say:

"During the winter of 1946-7, the supply of gas to residential customers in New York State was seriously impaired and the gas supply to industrial customers entirely suspended at times on account of failure of companies operating interstate transmission lines to furnish the amounts contracted to be delivered to the local distributing companies. We understand that you are cognizant of the details of this situation and the reasons therefor.

"From information supplied at the conference of representatives of state commissions and the Federal Power Commission held in Washington on February 21st, and testimony before this Commission in several cases since that time, it appears that the situation in the winter of 1947-8 may be even worse than that in the past winter and it is probable that residential customers in this state may have to actually discontinue use of natural gas in spite of all that can be done to increase the supply between now and December, 1947.

"Under these circumstances, it is our position that no authorization should be given to the applicants in Docket No. 880 (Texas Eastern Transmission Corporation) or to any other transmission line companies in the Appalachian area to extend service to new territory or to add additional industrial customers unless and until it is certain beyond any reasonable doubt that the supply of gas to present residential customers in New York State will be ample under the most adverse weather conditions which are at all likely to occur."

Angle Type Compressors

(Continued from page 37)

of the system.

It is my opinion that two and one half years of operation with angle compressor units is too short a period in which to develop operating information that should be considered as conclusive by the Industry. The system was constructed and manned during a very critical period with respect to material and personnel. Only forty-eight out of the original two hundred compressor station employees were experienced in station operation and only a relatively few of these had operated the angle type units. The personnel is being trained concurrently with heavy station operation and an ever present construction program. Consequently no outstanding fuel and oil consumption record has been made as every effort has been devoted toward keeping the gas moving.

Bethlehem Orders Coke Ovens From Wilputte

The Wilputte Coke Oven Corporation, 40 Rector Street, New York City, has been awarded the contract for a battery of 74 new coke ovens to be erected at the Johnstown, Pennsylvania, plant of the Bethlehem Steel Company. The ovens will have a capacity of more than 1,000 tons of furnace coke per day. Erection will begin at once and the project will be completed next year.

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EQUIPMENT FOR SALE

Complete 4½ foot Water Gas Set in good condition. Includes all necessary items for manufacturing gas at 528 BTU.

Gardner Gas, Fuel & Light Co., 2 Vernon Street, Gardner, Mass.

FOR SALE

Addressograph #3700

Immediate Delivery

Bought in 1946—used four months.

200 thousand Style C (EE) one-piece plates

Also . . . .

Addressograph #1900

Rochester Addressograph Agency will verify condition of equipment.

Address inquiries to:

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28 South Union Street

Rochester 7, New York

Phone—Main 3166

Rockwell No. 00 Meter

A 12 page sales bulletin has been issued by the Pittsburgh Equitable Meter Division of Rockwell Manufacturing Company describing the many features of the recently announced Rockwell-Emco No. 00 Gas Meter.

The details of construction are clearly portrayed by group assembly photographs with explanatory captions keyed to the principal parts. The several indexes available are illustrated. A capacity curve shows the volume characteristics of this unit when measuring manufactured, natural and LP-gases. Data is provided on the various styles of connections that can be furnished. All necessary factual information, including dimensions and weights, is summarized in a specification table.

Of particular interest to gas men is a section devoted to a technical discussion of the pressure cast aluminum alloy of which the outer casing for this light weight, compact meter is made. For copies of this bulletin write Pittsburgh Equitable Meter Division, Rockwell Manufacturing Company, Pittsburgh 8, Pa.

The annual meeting of Division Managers was recently held at the Company's headquarters in Pittsburgh.

W. F. Rockwell, Jr., who conducted the conference, explained that it is very closely tied in with the operational philosophy of the Company.

"At these meetings we spend considerably less time on over-all Company policies than we do on co-operative use of our facilities. We have 14 plants, extending from Hudson and Brooklyn, N. Y., to Oakland, California, and our products cover a very wide range, too. Consequently, we lay a great deal of stress upon interchange of manufacturing capacities and abilities."

EDWARD C. LAMLEIN

One of the deans of the gas appliance distributing world was lost to the industry with the death on April 6th of Edward C. Lamlein, President of the Gas and Electric Corporation of Detroit. Mr. Lamlein was 53.

Ed Lamlein was a graduate of the University of Michigan and found his first employment in the engineering department of an automobile manufacturer. He continued in this until 1917 at which time he entered the U. S. Army, being honorably discharged at the end of hostilities.

Mr. Lamlein was also Secretary and Treasurer of Siegel-Lamlein, Inc., a holding company chartered in 1936. Since 1937 he has represented the Roberts-Gordon Appliance Corporation in Michigan.

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erty and under same ownership." In another instance a company allows a branch service "Only where marked economy is apparent and right-of-way is secured." In another company "Joint or branch services are frequently installed when buildings are close enough together to make this practice economical." Another reports that a branch service is permitted "if installation can be made so bare pipe is exposed and readily inspected." One company says that they permit branch services but "reluctantly, and only where the expenses and work involved would be out of all proportions to the benefit of separate services." Another company reports that a branch service is "Used only to combat material shortages." These qualifying remarks illustrate the general attitude of the companies toward branch services and this probably will always be a practice which cannot be entirely eliminated but limited to the exceptions which seem to be warranted by good judgment.

Tabular Summary

It must be repeated that the foregoing data, observations, and comments regarding the installation of service lines, are based upon the results of answers received from a recent survey of a representative group of companies and can be looked upon as a probable indication of what exists throughout the entire gas industry. The tabulation is shown in the adjoining table for all sections*

Each company should be able to develop many helpful conclusions by studying the factors with which they are principally concerned. Careful study of the various practices in each section and differences, which in some instances prevail between companies distributing natural gas and those distributing manufactured and mixed gases, should be of assistance to anyone attempting to develop standards and specifications for the installation of gas service lines.

Explanatory Notes

The tabulation of practices in connection with domestic service lines, included herein, was compiled from questionnaires returned by 117 gas companies which operate a total of 11,611,500 service lines. Of the 117 companies represented, 52, with a total of 5,257,500 service lines, distribute natural gas, and 65, with a total of 6,354,000 service lines, distribute manufactured or mixed gas. With the exception of one Canadian company, all of the tabulated questionnaires were received from companies operating within the United States.

The tabulation is divided into seven parts, one for each of the six geographical sections (see map), and one for the totals of all six of the geographical sections. Each of the seven parts is divided into three columns—one for the totals of all gases, one for natural gas, and one for manufactured or mixed gas. The numbers listed in the columns represent the number of services (in thousands) and the number of companies (given in parenthesis) which follow a particular practice; for example, 438.5 (10) given in the tabulation would represent 10 companies with a total of 438,500 service lines.

The questionnaires were tabulated to the nearest five hundred service lines. In cases where the states served by a company were not all in one geographical section, the practices for that company were included in the section containing the majority of the states served.

In order to distinguish types of systems, with respect to operating pressures, for the analysis of some practices, the following "Definition of Pressures" was given in the questionnaire: "L.P. (Low Pressure) 2½" to 20", M.P. (Medium Pressure) 20" to 15 lbs., H.P. (High Pressure) 15 lbs. to 100 lbs."

The apparently high tabulation under the heading of "Other" in Question No. 14, "Please indicate your predominant practice for installation of shut-off valves or cocks on service lines" is due to the many locations and combinations of locations reported. The following are included as "Other": For low pressure, (1) ahead of meter and at main, (2) at property line or curb, (3) at property line or curb and main; For medium pressure, (1) ahead of meter, (2) ahead of meter and at property line or curb, (3) at property line or curb; For high pressure, (1) ahead of meter, (2) ahead of meter and ahead of regulator, (3) ahead of meter and at property line or curb, (4) at property line or curb.

In some cases, it may appear that inconsistencies exist in the tabulation. An example of this is in Question No. 15, "Is service stoppage a major problem in your company? If so, what is the predominant cause?" It may be seen that the totals of predominant causes do not equal the tabulation of companies which reported service stoppage to be a major problem. This is due to the fact that the predominant causes tabulated were taken from only the companies reporting stoppage as a major problem, and that in some cases these companies did not state the causes. It may be noted that Question No. 18, "Please indicate your principal methods for installing services under pavement" that the totals of the separate practices will exceed the number of companies reporting. This is due to the tabulation of two or more methods for one company in many cases. If a company uses a method enough to justify reporting it as a principal method, the tabulation should prove informative.

In other cases where the totals do not agree, the lack of agreement is due to insufficient qualifications or ambiguity of answers. In cases of ambiguous answers, it was deemed better to omit them in tabulating, thereby producing a slightly less complete picture rather than possibly an erroneous one.

** Individual tables for each section are given in the complete paper available through A. G. A.—Ed.*

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